# The Role of the Community Pharmacists in the Management of Acute Pain in Adults: A Scoping Review

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# Table of Contents

# Abstract

Acute pain is under-treated and results in negative health outcomes in older adults. A link to community experts, such as community pharmacists (CP), could support the self-management of acute pain in adults following hospital discharge and result in improved outcomes. Knowledge of CP's current practices in the management of acute pain in adults and barriers to the delivery of such care is lacking. We conducted a scoping review to describe CPs' practices or interventions in acute pain management in adults, and to identify current barriers and facilitators/solutions to CPs' engagement in the management of acute pain in this population.

We searched the literature in 5 bibliographic databases for eligible studies published after 1990 including scoping and systematic reviews, experimental, observational, and qualitative studies. Search terms included acute pain, postoperative pain, low back pain, opioid, pharmaceutical services, community pharmacy, patient education, etc. Search results were independently screened for inclusion criteria by 2 reviewers. Study design, participants, CP intervention and engagement characteristics were extracted. The results were synthesized and presented using numerical frequency analysis. We subsequently proceeded with a thematic framework analysis to thematically organize the acute pain management interventions, barriers, and facilitators/solutions for pharmacists and patients.

We identified 2424 studies and retained 34 studies for extraction; most were published between 2010 and 2021 (76%). Identified studies were predominantly observational cross-sectional studies (n = 21 [65%]), and the remainder were experimental and non-experimental studies (n = 9 [27%]), and knowledge synthesis studies (n = 2 [6%]). CPs intervene mostly in the domains of acute non-specific low back pain (n = 17), dental pain (n = 6), and musculoskeletal injuries (n = 6). Interventions designed to manage these acute pain conditions were categorized

into interventions targeting CPs and interventions targeting patients. The CP-targeted interventions included the implementation of professional associations' clinical practice guidelines or processes of care to assess and expand their role in acute pain care. The patient-targeted interventions included tools and educational interventions to properly manage their acute pain condition (s). Patient- and CP- targeted patient counselling (n = 19), professional educational programs (n = 7), pamphlets (n = 4), simulated-patient scenarios (n = 5) covering disease management services, opioid stewardship, non-pharmacological therapies, self-care advice, and referrals to specialists were identified as interventions.

Barriers identified by CPs included lack of knowledge and training in acute pain care, lack of patient knowledge on acute pain, and time constraints. Patients' tendencies to self-medicate, their lack of awareness of the role of CPs in acute pain care, and patient-specific time constraints were cited as barriers limiting patients' ability to manage their acute pain in the community setting. Proposed solutions comprised expanding CPs' knowledge and education on acute pain, implementing patient-oriented programs and point-of-care tools, improving CPs' collaboration with healthcare professionals (HCPs), and providing financial and institutional support. Solutions to mitigate patient-specific barriers also included increased educational practices through the use of digital tools for self-management of acute pain, education on appropriate acute pain management practices, and health promotion tools highlighting CPs' contribution to acute pain care.

Our findings identified the presence of knowledge gaps in CPs' roles and engagement in the management of acute pain in adults in the community setting which should be the focus of future research. As such, further evaluation and implementation of efficient educational programs and tools (including digital health tools) to improve knowledge and self-efficacy in acute pain

management for CPs and patients need to be explored. The means to increase the roles of CPs and patients' awareness of CPs' role in acute pain services, health promotion and management strategies depend on the involvement and support of governmental bodies, professional associations and community healthcare service providers. Multidisciplinary approaches that include patients as partners towards optimal acute pain management frameworks such as is seen in other chronic disease management should be researched.

In conclusion, our review identified that CPs currently participate in the management of acute pain through a limited number of practices that revolve around education (self-education and patient–targeted education) and documented a limited use of digital point-of-care tools. The most frequently identified barriers included lack of knowledge (CPs and patients) and time constraints. The knowledge gained from this scoping review can inform the development and implementation of solutions such as tools and educational programs for CPs to support adults in better management of acute pain. Should they be provided with the appropriate tools and financial support CPs could take on the leadership role that would optimize the management of acute pain in their community. This would lead to expanded collaborations between CPs, family physicians and other members of the healthcare team for better implementation of acute pain management protocols and better health outcomes for patients.

# Abrégé

La douleur aiguë est sous-traitée et entraîne des conséquences néfastes sur la santé des personnes âgées. Un suivi avec des experts communautaires, tels les pharmaciens communautaires (PC), pourrait optimiser l'autogestion de la douleur aiguë chez les adultes après leur congé de l'hôpital et entraîner de meilleurs résultats. Les connaissances sur les pratiques courantes des PC dans la gestion de la douleur aiguë chez les adultes ainsi que sur les obstacles à la prestation de tels soins sont insuffisantes. Nous avons effectué une étude de la portée pour décrire les pratiques et les interventions des PC dans la gestion de la douleur aiguë chez les adultes, et pour identifier les obstacles et les facilitateurs-solutions actuels en ce qui concerne l'engagement des PC dans la gestion de la douleur aiguë dans cette population.

Nous avons étudié la littérature provenant de 5 bases de données bibliographiques pour identifier des études éligibles publiées après 1990, y compris des études de la portée, des revues systématiques ainsi que des études expérimentales, observationnelles et qualitatives. Les termes incluent « acute pain », « postoperative pain », « low back pain », « opioid », « pharmaceutical services », « community pharmacy », « patient education », etc. Les résultats de la recherche ont été indépendamment examinés pour les critères d'inclusion par 2 examinateurs. Les caractéristiques du protocole de l'étude, des participants, de l'intervention des PC et de leur engagement ont été extraites. Les résultats ont été synthétisés et présentés à l'aide d'une analyse de fréquence numérale. Nous avons ensuite procédé à une analyse du cadre thématique pour organiser thématiquement les interventions de gestion de la douleur aiguë ainsi que les barrières et les facilitateurs-solutions pour les pharmaciens et les patients.

Nous avons identifié 2424 études et avons retenu 34 études pour l'extraction; la plupart ont été publiées entre 2010 et 2021 (76%). Les études identifiées étaient principalement des études

transversales (n = 21 [65%]), et le reste était des études expérimentales et non-expérimentales (n = 9 [27%]) et des études de synthèse de connaissances (n = 2 [6%]). Les PC interviennent surtout dans les domaines des lombalgies aiguës non-spécifiques (n = 17), des douleurs dentaires (n = 6), et des lésions musculosquelettiques (n = 6). Les interventions conçues pour gérer ces conditions de douleur aiguës étaient classées en interventions ciblant les PC et en interventions ciblant les patients. Les interventions ciblant les CP incluaient la mise en œuvre des lignes directrices de pratique clinique ou des processus de soins des associations professionnelles dans le but d'évaluer et d'élargir leur rôle dans les soins de la douleur aiguë. Les interventions ciblant les patients incluaient les outils et les interventions éducationnelles afin de gérer adéquatement leurs conditions de douleur aiguë. Les conseils aux patients ciblés sur les patients et les PC (n = 19), les programmes éducatifs professionnels (n = 7) et les brochures (n = 4), les scénarios de patients simulés (n = 5) couvrant les services de gestion des maladies, la gestion des opioïdes, les thérapies non pharmacologiques, les conseils d'auto-prise en charge et les références à des spécialistes ont été identifiés comme des interventions.

Les barrières identifiées par les PC comprenaient le manque de connaissances et de formation en soins de la douleur aiguë, le manque de connaissances des patients sur la douleur aiguë et les contraintes de temps. Les tendances des patients à l'automédication, leur manque de sensibilisation au rôle des PC dans les soins de la douleur aiguë et les contraintes de temps propres aux patients ont été cités comme des obstacles limitant la capacité des patients à gérer leur douleur aiguë dans le cadre communautaire. Les solutions proposées comprenaient l'élargissement des connaissances et de l'éducation des PC sur la douleur aiguë, la mise en œuvre de programmes et d'outils aux points de service axés sur le patient, l'amélioration de la collaboration des PC avec les professionnels de la santé (PS) et la fourniture d'un soutien financier et institutionnel. Les solutions

pour atténuer les obstacles spécifiques aux patients comprenaient également une augmentation des pratiques éducatives grâce à l'utilisation d'outils numériques pour l'autogestion de la douleur aiguë, une éducation sur les pratiques appropriées de gestion de la douleur aiguë et des outils de promotion de la santé soulignant la contribution des PC aux soins de la douleur aiguë.

Nos résultats ont identifié la présence de lacunes dans les connaissances concernant les rôles et l'engagement des PC dans la gestion de la douleur aiguë chez les adultes en milieu communautaire, ce qui devrait être au centre des études futures. En tant que tel, une évaluation plus poussée et une mise en œuvre de programmes et d'outils éducatifs efficaces (y compris des outils de santé numériques) pour améliorer les connaissances et l'auto-efficacité dans la gestion de la douleur aiguë pour les PC et les patients doivent être explorées. Les moyens d'accroître les rôles des PC et la sensibilisation des patients au rôle des PC dans les soins de douleur aiguë, la promotion de la santé et les stratégies de gestion dépendent de la participation et du soutien des organismes gouvernementaux, des associations professionnelles et des fournisseurs de services de santé communautaires. Des approches multidisciplinaires qui incluent les patients en tant que partenaires vers des cadres optimaux de gestion de la douleur aiguë tels que ceux observés dans la gestion d'autres maladies chroniques devraient être étudiées.

En conclusion, notre revue a identifié que les PC participent actuellement à la gestion de la douleur aiguë par le biais d'un nombre limité de pratiques axées sur l'éducation (auto-éducation et éducation ciblée sur le patient) et a documenté une utilisation limitée des outils numériques au point de service. Les barrières les plus fréquemment identifiées comprenaient le manque de connaissances (PC et patients) et les contraintes de temps. Les connaissances acquises grâce à cette étude de la portée peuvent optimiser le développement et la mise en œuvre de solutions telles que des outils et des programmes éducatifs pour les PC afin de soutenir les adultes dans une meilleure

gestion de la douleur aiguë. S'ils disposaient des outils et du soutien financier appropriés, les PC pourraient assumer le rôle de leadership qui optimiserait la gestion de la douleur aiguë dans leur communauté. Cela conduirait à des collaborations élargies entre les PC, les médecins de famille et les autres membres de l'équipe de soins de santé pour une meilleure mise en œuvre du plan de gestion de la douleur aiguë et pour de meilleurs résultats pour la santé des patients.

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## Contribution of Authors

The MSc candidate (Khiran Arumugam) wrote the initial draft of all sections of this thesis. Under the guidance of the thesis supervisor (Dr. Suzanne Morin) and experienced medical librarian (Amy Bergeron), the candidate prepared the scoping review protocol uploaded to the Open Science Framework registries, performed the literature search on relevant electronic databases, imported and selected the eligible studies using the Covidence software library and EndNote X9 1.1, conducted analyses manually and using the NVivo 13 software, and drafted the manuscripts. Dr. Morin supervised all aspects of the projects, revised the drafts and was responsible for the study results. The candidate performed the statistical analysis and thematic framework analysis with the assistance of the research associate (Kathy Khorramak) under the supervision of Dr. Fateme Rajabiyazdi. Dr. Morin and the candidate had access to the data and vouched for the validity of the data.

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# List of Figures

# List of Tables

## List of Abbreviations and Acronyms

ED: Emergency Department

NA: North America

US: United States

PNS: Peripheral Nervous System

NRS: Numeric Rating Scale

WHO: World Health Organization

NSAIDs: Non-Steroidal Anti-Inflammatory Drugs

OTC: Over-the-Counter

CP: Community Pharmacist

NMDA: N-methyl-d-aspartate

CPG: Clinical Practice Guideline

HCP: Healthcare professional

OSF: Open Science Framework

JBI: Joanna Briggs Institute

MESH: Medical Subject Headings

KA: Khiran Arumugam

KK: Katayoun Khorramak

PA: Physical Activity

CDSS: Clinical Decision Support System (CDSS)

GP: General Practitioner

# Chapter 1: Introduction

## 1.1. Rationale

Pain affects millions of adults each year because of trauma, illness, or surgery (1). It is a frequent reason for admission to the emergency department (ED) and intensive care units (2). Moderate to severe pain accounts for up to 78% of 100 million ED visits annually in the United States (US) (3-6). Following discharge, over a third of unexpected hospital readmissions are consequent to persisting pain (7). Despite the existence of multiple clinical practice guidelines, pain, particularly acute pain, is under-recognized and undertreated in older adults both in and out of the hospital, leading to negative clinical outcomes (8-10). Unrelieved pain may result in extended length of stay in the hospital, hospital readmissions, and decreased patient satisfaction with pain medication (11). To mitigate the potential risks of poorly controlled acute pain in adults, it is essential to investigate the gaps in clinical practice limiting the delivery of an effective assessment and management of acute pain.

Multi-system approaches including education, pain assessment strategies, translational management, and the use of medications (opioid and non-opioid agents) with restorative therapies and behavioural strategies are recommended in the management of acute pain in both hospital and community settings (12-14). Opioid use can pose challenges and health risks in older patients and can lead to opioid misuse as has been documented in the lay press and scientific literature (15-17). Opioid prescriptions are linked to long-term opioid use, and elevated risks of opioid misuse which, in turn, can lead to increased rates of harm, delayed recovery, and hospital readmissions (18, 19). In fact, from 2010 to 2015, opioid-related hospitalizations increased by 34% in older adults, while opioid-related ED visits increased by 74% in the United States (US) (20). Appropriate guidance

on opioid use is required to keep patients, their families, and their communities safe while ensuring optimal acute pain management.

Current progress in pain management over the last decade has demonstrated that effective pain relief can be achieved with the proper combination of pharmacotherapies and care pathways. Yet, inadequate access to health care facilities and pain services in a timely manner is a common barrier to acute pain management. Consequences of access barriers include increased risk of disability, personal healthcare expenses, decreased job productivity, loss of independence, functional limitations, etc. (21) Studies have shown that effective training programs, multimodal approaches to analgesia, and increased access to medications (i.e., prescription refills, over-the-counter [OTC] analgesics, etc.) can improve acute pain management (22). A frequently proposed solution for inadequate access to healthcare facilities is to provide patients or caregivers with the option of purchasing readily available pre-prescribed analgesics including paracetamol, ibuprofen, and diclofenac from their local pharmacies (23). Easy access to reliable health information, pain relief recommendations, and skills can empower adults to effectively self-manage their acute pain with minimized risk of harm. A healthcare provider expert in pain management close to the patient would be an asset and could guide the management of acute pain conditions.

Community pharmacists (CPs) are often the first point of patient engagement in the healthcare system. They are key players in guiding patients in the early management of acute pain in the outpatient setting and the intermediary between the patient and their primary care physician. Positive outcomes of CPs' engagement in pain care include improved patient satisfaction with pain medications, better guideline-concordant opioid-based pain management and reduced burden on the healthcare system (24, 25). Their contribution to patient education is known to be effective and, in the current context of healthcare services access limitations, their support of patients in the

management of acute pain must be further explored (24, 26).

Through a non-exhaustive review of the literature, we noted that interventions involving CPs in pain care focused primarily on *chronic* pain assessment and management (27-38). While there is encouraging preliminary evidence of effective interventions and management programs on chronic pain outcomes, our findings suggest there is a lack of knowledge on if and how CPs get involved in the management of acute pain in older adults (11). This is particularly important since patients are now discharged very early from the hospital settings following surgery or musculoskeletal injury and must manage their acute pain at home with long delays prior to the reassessment by their treating physician.

In view of the importance of CPs in day-to-day patient care and the need to provide timely and in-community guidance to patients, we conducted a scoping review to identify and summarize the evidence in the literature on the role of CPs in acute pain management in community-dwelling adults of all ages and identify areas for future research or program implementation.

## 1.2 Aim and Objectives

The overarching aim of this thesis was to provide a comprehensive description of interventions used in practice by CPs to support acute pain control in adults and to better understand the barriers that must be addressed to increase their involvement in the management of acute pain in this population, with specific attention to patient self-management and digital technology. Therefore, our objectives were to:

### 1.2.1 Describe CPs' extent, range and nature of practices or interventions in acute pain management in adults.

### 1.2.2 Identify current barriers and facilitators in CPs' engagement in relation to adults' self-management of acute pain.

To answer these objectives, we posed the following questions:

1.2.1 a) What are the practices or interventions used by CPs to manage acute pain secondary to a recent condition in adults?

b) What are the conditions associated with acute pain that is managed by CP in non-hospitalized adults?

1.2.2 What are the barriers and/or facilitators to the implementation of these practices or interventions in clinical practice?

# Chapter 2: Literature Review

## 2.1 Acute Pain in Adults

Pain-related issues account for up to 80% of visits to physicians (39). Pain can lead to disability, anxiety, risk of further injury, and burden to the patients, the health care system and society overall. Although pain in general is the root cause of an overwhelming majority of chief complaints in the ED, it is unique to each patient (2, 3, 40). Pain is commonly described as either acute or chronic.

Pain represents a somatic experience perceived by the peripheral nervous system (PNS) following a threat, a noxious stimulus, to the physical integrity of the human body, otherwise characterized as a physiological response with varying degrees of affective, cognitive, and behavioural components (41). When the tissue is exposed to this noxious stimulus, either mechanical, chemical, or thermal, it causes nociceptive neurons (i.e., nociceptors) to activate and increase their discharge rate (42). The affected tissue region and recruited immune cells will secrete molecular mediators that act on the nociceptors to initiate pain sensitization (i.e., a reduction in the threshold for sensation and an increase in the magnitude of a physiological response to the noxious stimulus). Nociceptors are specialized sensory neurons that mediate pain alongside the immune system (43). This intercommunication within the physiological response of pain is described as active crosstalk specifically between nociceptors and the immune system for pain regulation. Thus, recommended analgesic interventions (e.g., non-inflammatory drugs [NSAIDs] and acetaminophen, opioids, local anesthetics, N-methyl-d-aspartate [NMDA] receptor antagonists, adrenergic and cholinergic agonists) alleviate pain and inflammation by targeting specific steps within the cascade of responses that occur following inflammation or tissue injury.

Under-treated and unrelieved acute pain in adults may subsequently impose a heavy socioeconomic burden on society and lead to a higher risk of chronic pain becoming far more

challenging to treat (4, 11, 45, 46). Indeed, 50% of adults who presented themselves to the ED with acute pain at a moderate to severe pain intensity reported that their pain had not been relieved by the time of discharge (44). Among another cohort of 842 patients presenting to the ED in the US with moderate to severe pain, only 60% received analgesics, and 74% of adults reported that their pain persisted following discharge (47).

Unlike chronic pain, acute pain is often provoked by acute injury in association with skeletal muscle spasms and sympathetic nervous system activation is short-lived (lasting fewer than three to six months) and is usually self-limited. (42). Known causes of acute pain include acute musculoskeletal injury (fracture, sprain), post-surgical pain, ischemic event (infarction), acute inflammation of an organ (pancreatitis, appendicitis, peritonitis), toothache from post-wisdom teeth removal, etc.

Postsurgical or postoperative pain is a commonly observed acute pain condition. An estimated 88% of patients reported moderate-to-severe pain in the first 72 hours after surgical procedures (8, 48). Consequences of unrelieved postoperative pain include prolonged recovery, delayed hospital discharge, unanticipated hospital readmissions, and high healthcare costs (7, 11, 49, 50). Similarly, fractures associated with acute pain, if not properly managed, can lead to loss of autonomy, anxiety, reduced quality of life, increased risk of falls, and recurrent fractures (51, 52). In a cross-sectional study, 67 adults between the ages of 47 and 89 were asked to recount their pain experiences following a fragility fracture: they reported that their acute pain was generally unrelieved consequently affecting their mobility, functional activity, independence, sleep, and energy (53). They also noted that their physicians often underestimated the amount of time needed for their recovery and thus, inadequately managed their pain. These findings highlight the importance of accessible pain management resources to patients once they leave the hospital.

## 2.2 Acute Pain Management Approaches and Characteristics

The therapy of acute pain is aimed at treating the underlying cause and interrupting the nociceptive signals. An accurate evaluation of the patient's acute pain will allow for quantitative and qualitative assessment of response to the first-line treatment such as pharmacological, or non-pharmacological treatment options (54). Evaluation of the effectiveness of the analgesic regimen requires the patient's involvement in regular self-assessment of pain intensity ratings (preferably using a scale, such as the Numeric Rating Scale) following administration of pharmacological and non-pharmacological interventions and reporting back to the HCP (54, 55).

*Assessment of acute pain*

A reliable assessment of a patient's pain is crucial for effective clinical care. Pain assessment tools are also subjective and descriptive of the patient's pain experience (13, 55). Many factors that describe the patient's pain experience must be thoroughly investigated including pain intensity, pain interference with daily activities, quality of pain, onset and pattern of pain, location, self-efficacy, physical & psychological functioning, time to pain control, etc. The World Health Organization (WHO) and the Intervention Association for the Study of Pain have developed a classification tool when assessing chronic and acute pain which considers the classification or type of pain, descriptive factors, and the temporal aspects of pain (i.e., acute, chronic, ongoing, or intermittent pain) to facilitate the selection of an appropriate treatment pathway (13, 56). This classification tool and its descriptive factors work in tandem with one-dimensional pain intensity scales commonly used as pain assessment tools in hospitalized patients to measure their experience of pain (i.e., pain intensity). These assessment scales include the Numeric Rating Scale (a scale from 0 to 10 where 0 represents no pain and 10 represents the worst pain), the Verbal Rating Scale, the Abbey Pain Scale, and the Visual Analog Scale (57, 58).

Many tools are available to effectively assess acute pain and there is insufficient evidence to recommend a specific pain assessment tool over another; however, the Numeric Rating Scale is the most frequently used pain scale in healthcare (58). Patients' perception of pain can nevertheless be difficult to qualify, and this may lead to overestimated or underestimated pain intensities (57, 58). This inconsistent evaluation of pain can lead to improper prescribing of opioids and increased risk of opioid-related harms (59). These findings have been reported in a diverse group of patients experiencing pain from burns, cancer, or osteoarthritis (46, 60, 61). HCPs should strive to obtain an assessment of *the patient*'s acute pain experience as a critical means to the delivery of an effective and individualized acute pain management regimen.

*Management of acute pain*

Professional association's including the American Pain Society and the American Society of Regional Anesthesia and Pain Medicine have developed recommendations for optimal and comprehensive postoperative pain management aimed at promoting patient recovery and rehabilitation after discharge (62). These recommendations include pain education, pain assessment strategies, multimodal analgesia, choice of opioid and non-opioid treatment options, psychosocial interventions, anxiety reduction strategies, transcutaneous electrical stimulation, and translational management (13, 14, 63-65). Similar treatment approaches are proposed for most medical conditions (13).

*i. Non-pharmacological therapies*

Non-pharmacological therapies aimed to treat the affective, cognitive, and behavioural dimensions of acute pain (66). They are methods that target and control the transmission of pain from the surface of the body to the brain. Acupressure, acupuncture, cold-hot treatments which control the inflammation process linked with pain or inhibit the heat receptors and vasodilation effect (e.g.,

application of cooling material, hot compresses, warm baths, etc. on the body), transcutaneous electrical nerve stimulation (TENS, the electrical stimulation of the skin to manage the pain), musical therapy, rest, etc. are frequently used in pain management (66). Often, they are used in conjunction with standard pharmacological treatment options as a complementary component of the care pathway. The purpose of non-drug therapies for pain management has been to increase the individuals control in their recovery, improve functional capacity, decrease the feeling of weakness, reduce the pain level, reduce stress and anxiety, and minimize the need and dosage of analgesic drugs thus decreasing the potential adverse effects (66, 67). The combination of pharmacological and non-pharmacological therapies is a commonly recommended strategy to provide patients with more control over their recovery while ensuring that the pain can be managed in an effective and less invasive manner.

*ii. Non-opioid analgesics*

Non-opioid analgesics such as acetaminophen, aspirin, NSAIDs (e.g., ibuprofen, diclofenac, naproxen, and COX-2 inhibitors), topical agents (e.g., lidocaine) are either prescribed or available over the counter medications. When patients present with low to moderate pain intensity, clinical practice guidelines suggest first considering non-pharmacological treatment options with low doses of NSAIDs or acetaminophen for the shortest period (68). Non-opioid analgesics are commonly known as a safe and effective first-line therapy alternative to opioids for mild to moderate acute pain (69-71) An effective pain management approach in older patients also consists of non-opioid analgesics as an integral part of the pharmacologic treatment regimen to reduce the dose of opioid analgesics that is first prescribed. This, in turn, will help reduce the frequency and severity of opioid-induced adverse effects.

### *iii. Opioid analgesics*

Opioids are the preferred analgesic for moderate to severe acute pain (72, 73). Opioids act on opioid receptors in the brain, spinal cord, and other areas of the body. These drugs inhibit the transmission of nociception and activate inhibitory pathways to reduce pain and inflammation. (73). Opioid drugs include buprenorphine, codeine, fentanyl, hydrocodone, hydromorphone, meperidine, methadone, morphine, oxycodone, naloxone, tramadol, etc. Morphine and its derivatives are the first-line opioid agents for the treatment of short-term moderate to severe acute pain and post-operative pain (64, 65).

In recent years, there has been an effort by healthcare providers to educate patients and to provide the lowest level of opioid analgesics to control acute pain consequently reducing the harms associated with what has been referred to as the "opioid crisis". This is of great importance since over-prescription of opioids (high number of opioid tablets, high number of repeat prescriptions or high dose) following a surgical procedure or trauma has been considered a contributing factor to the current opioid crisis in North America (16, 17). A significant proportion of opioid-naïve patients who have undergone surgical procedures become persistent opioid consumers or divert unused opioid tablets for nonmedical use (74-76). Opioid adverse events result in increased hospitalization, cost of care, and mortality rates. An effective prescribing option for managing acute pain is dependent on the balance between the risks (opioid-related adverse events, opioid misuse) and benefits of pain control for each patient.

### *iv. Multimodal analgesia*

Multimodal analgesia therapy (e.g., epidural analgesia, intercostal nerve block, thoracic paravertebral block, intrathecal opioids, etc.) is an increasingly used element of pain management for a variety of acute pain conditions (69). These techniques lead to a reduction in the incidence

and severity of opioid-induced side effects (77). Multimodal analgesia therapies have been shown to improve pain control and decrease opioid analgesic use and the impact of pain on activities of daily life (77-79). Used or initiated in the hospital setting, they can help control pain at home in the early days following discharge.

*Patient involvement in acute pain management*

Increasing patients' involvement in the clinical decision-making process is an opportunity to strengthen the overall effectiveness of pain management approaches. Patients participate by self-reporting pain intensity to reduce the chances of underestimated pain measurements. Authors have suggested that patient participation in their care has positive correlations with improved health outcomes such as the decreased risk of frequent acute pain episodes and increased severity of pain (81, 82).

Patients can be involved in their care by obtaining health information on their current pain state, setting realistic pain management goals (e.g., expected pain intensity), and selecting the best and preferred pharmacologic and non-pharmacologic treatment options, and discharge plans in collaboration with their HCP. This is often observed in the setting of chronic pain management where adults are involved in care through means of monitoring or self-reporting their pain using electronic tools (e.g., mobile applications, online platforms, etc.) (83). Patients' active participation in and interactions with HCPs when coordinating their care reinforces self-empowerment in patients and shared decision-making between patients and their healthcare providers (83). For instance, in a patient-controlled analgesia initiative developed for patients after cardiac surgery and compared to usual care, the authors observed that the self-administration of smaller doses of analgesics was comparable to that obtained from nurse-managed intravenous

opioids in terms of pain control. (84, 85). Acute pain management is anticipated to have positive clinical implications with the integration of patient experience and participation.

*Access to acute pain care services in the community*

Multiple factors contribute to barriers to access to acute pain care services including extended waiting times, transport limitations to healthcare points of service, lack of social or caregiver support, and tight regulation of prescribed opioids (80, 86, 87). Likewise, the limited choices for pain care services accessible to patients within their community represent a significant challenge to accessing urgent treatment options for patients' pain management needs. This is particularly difficult in older adults suffering from musculoskeletal injuries, fractures or acute pain which compromises their mobility and discourages them from seeking treatment (88). A link to a healthcare expert within the community can thus increase access to pain care while minimizing unnecessary burdens on EDs and hospital clinics, already strained with patients requiring a higher level of care. Currently, patients have inconsistent and insufficient access to acute pain services in the community (113).

## 2.3 Community Pharmacist's Role in the Healthcare System

Community pharmacists (CP) are often the first point of contact for patients with the healthcare system. Patients visit their pharmacists five to eight times more frequently than their primary care physicians (72, 89). As trusted health professionals at the forefront of healthcare, CPs provide access to care to patients in urban, rural, and underserved communities. They also offer communities perceived affordability of services, drug dispensing, and a provision of timely medical advice and self-management tools (89).

CPs deliver public education, face-to-face counselling, and advice on medication management as well as dispense prescribed medications. Among the services provided, CPs are

primarily recognized for delivering one-on-one counselling to patients which involves informing them on the medical condition process and progression, self-care advice or non-pharmacological therapies, the role and purpose of prescribed medications, the potential drug interactions, and adverse reactions of drugs. Furthermore, when patients present with any clinical "red flag" symptoms, CPs often prompt urgent referrals to an HCP as per patients' needs (72, 90).

CPs promote the proper use of analgesic drug therapies and conduct evaluations of medication use with the purpose of improving the risk and benefits profile (e.g., side effects, drug interactions, and contraindications) of analgesic therapies and health outcomes. CPs can consult and advise HCPs about effective drug therapy recommendations and dosage regimes based on their professional expertise in pharmacotherapy (89). These CP-led initiatives include physician mentoring on prescribing practices, and prescription drug monitoring programs (i.e., following best practice guidelines and ensuring opioid prescriptions in appropriate quantities). As such, CPs represent important sources of advice and knowledge for both patients and physicians.

Recently, many jurisdictions have started to recognize new roles of CPs as part of the multidisciplinary primary care teams (89, 91). Within a well-defined framework, they are in a strong position to influence patient care through chronic disease management services ranging from asthma management, hypertension management, cardiovascular disease management, diabetes management, arthritis management, and mental illness, to pain management services (38, 72, 92-99). In 2022, a four-month pharmacist-led intervention led to the discontinuation of inappropriate medication in a cohort of 142 patients presenting with a chronic condition and poor health literacy (92). CP-led management programs include health promotion and education, screening and risk assessment, therapy optimization, medication counselling and review, and treatment monitoring. CPs' engagement in several chronic conditions has been shown to improve

quality of life, clinical outcomes, and patient knowledge of their medical inquiries (98-101). Additional reported CP-led benefits include reduced emergency room and in-patient admission, associated costs, risk behaviours and risk factors for injuries (91). This reinforces the need to further expand CPs role to acute pain management.

### 2.4 Practices of Community Pharmacists in Supporting Patients in Pain Management

*CP-led interventions in acute and chronic pain management*

We have noted that existing CP interventions offered to patients in the communities are mostly focused on chronic pain management with limited knowledge and available evidence-based acute pain practices in community pharmacies (24, 106). CPs engagement often consists of medication counselling and review (adherence and compliance), in-pharmacy educational programs, continuing medical education on pain management, opioid risk management, transition-of-care coordination, lifestyle/wellness counselling, screening and disease monitoring and management (care plan development and prescription drug monitoring programs) (25, 102-104). As a result, they improve patients' health literacy, patient satisfaction with pain medications, and pain management outcomes, decrease the risk of addiction to opioids and opioid-related harms, and reduce the burden on the healthcare system (24, 25, 104, 105).

Interventions used by CPs include telephone-based interventions, video-conferencing technology, educational pamphlets, face-to-face consultations, E-registries (electronic health systems/software), and video-based multimedia patient education programs (28, 108-111). Some interventions were implemented with the aim of increasing patient knowledge of their condition, increasing behavioural instructions regarding pain management (e.g., medication reviews), and supplying patients with the self-management skills needed for positive patient-centred outcomes (112). As readily accessible medication experts, CPs are trained to reduce the risk of opioid misuse

and the risk of overdose in patients. They have been shown to effectively educate the public and prescribers on the signs and symptoms of opioid overdose and toxicity (114). CPs can ensure that prescribers follow guidelines by recommending alternative non-opioid pain relievers, adjusting the medication doses, and informing on tapering regimens.

*Evidence-based community pharmacy practice in acute pain care*

Currently, CPs' involvement in acute pain management is scarce. The American college of physicians issued an updated version of clinical and community practice for the management of acute and subacute low back pain (LBP) that promote CP involvement. The guidelines prioritized the recommendations on appropriate reasons to exclude a serious cause or "red-flag", the reassurance of a favourable prognosis, the need to stay active, avoiding extended periods of bed rest, and the use of superficial heat, massage, acupuncture, or spinal manipulation (115). This updated version of evidence-based clinical guidelines recommends NSAIDs or skeletal muscle relaxants as the first-line drug therapy if desired. In Australia and the United Kingdom, there have been 'new pharmacy contracts' and 'patient group directives' that focus on enhancing CP and patient involvement in care (116). These initiatives have permitted CPs to dispense emergency analgesics, when necessary until an appointment with a specialist can be scheduled thereby maximizing pain control and reducing misuse of resources (e.g., GP).

In Canada, during the COVID-19 pandemic, regulatory changes to the Controlled Drugs and Substances Act were permitted to expand pharmacists' authority to provide all individuals with opioid medications as needed (113). In Quebec, legal and policy modifications have expanded the scope of practice of pharmacists allowing more modification and adjustment of medications to ensure efficacy (118). Patient awareness of CP expanded practices must be further emphasized particularly in view of increased barriers to timely access to healthcare services. (24, 26, 106).

Over the last two decades, evidence has demonstrated the lack of availability and accessibility to acute pain care services that match the patient's unique needs, such as self-management, wellness-oriented programs, and interprofessional care including community-based care. This gap provides an opportunity to expand CPs roles.

### 2.5 Digital Health Technology in Community Pharmacy Practice

Digital health technology has gained momentum offering opportunities to optimize clinical care delivery. The concept of digital health is the use of information and communication technologies in different health professions to manage illnesses and health risks while promoting health and wellness in patients (117). Digital health includes wearable devices, mobile health, telehealth, health information technology, and telemedicine. They can be used to collect health data, monitor signs and symptoms, deliver care remotely, and/or educate patients (117). The use of digital tools such as mobile applications and web-based programs for healthcare delivery has improved accessibility to healthcare services, patient experience and self-efficacy skills (119-122).

Previous work has shown that among older adults who sustained a recent fracture, 81% owned at least one mobile device, and 69% had the eHealth literacy skills to manage mobile applications (123). In collaboration with patient partners, the development of a mobile telephone application that proposes algorithms to optimize pain assessment, provide recommendations on medication use and non-pharmacological therapies, and on safe exercises for patients to use at home following discharge from the hospital has been recently developed (107, 123, 124). A link to a community expert close to the patient, such as a CP, was cited as very important by patients to provide reassurance, improve self-efficacy, and promote confidence.

Of interest is the use of mobile platforms for the management of chronic conditions such as diabetes promoting safe insulin use and reducing the incidence of hypoglycemia (125). A few

mobile applications used by CPs have been shown to convey appropriate patient education (i.e., learning about non-communicable diseases and their related management) and monitor treatment outcomes (126, 127).

Patient-controlled analgesia delivery systems are another example of such technology: they play a key role in improving the quality of acute pain management following surgical procedures and increasing the patient's involvement in this process (128). A few studies have introduced interactive electronic clinical tools such as Web- applications, to support patients who present themselves at pharmacies with acute pain. However, the use of these systems is currently limited because of the number of healthcare resources necessary for their administration. Therefore, there exists a need for novel technologies and initiatives that will simplify the acute pain management process and reduce the number of healthcare resources necessary to provide patients with quality acute pain care (129).

# Chapter 3: Methodology

## 3.1 Research Design: Scoping Review

When conducting a scientific study, there is a mandatory investigation of previous reports and studies in the literature related to the topic of interest. This approach in synthesizing available research allows researchers to bridge a vast and scattered assortment of research studies and articles giving rise to conclusions in a broader scope that individual research designs cannot address alone (130). This form of methodology is defined as a literature review which is often utilized as a means to tackle broader research questions or topics. Literature reviews have become methodological tools with the goal of summarizing and presenting overviews of knowledge derived from a body of literature. In the scientific and healthcare field, narrative literature reviews have been proven to advance understanding and decision-making regarding certain unanswered questions and issues (130). There are various types of literature reviews including systematic reviews, rapid reviews, scoping reviews, mapping reviews, and mixed methods reviews (130, 131).

*Systematic Review*

A systematic review aims to answer targeted questions to estimate the effectiveness of treatments or interventions (131). This research synthesis selects, critically appraises, extracts, and analyzes data from eligible primary research studies to provide a comprehensive and unbiased synthesis (i.e., summarizing and linking different sources of information) of the available information. A well-conducted systematic review uncovers all the evidence that reports data rather than prioritizing the concepts or theories relevant to the research question (132, 133). Due to its focus on a specific research question, the comprehensive search for evidence regarding the efficacy of treatments and its rigorous appraisal of validity combined with meta-analyses to statistically summarize the results, systematic reviews have been shown to influence clinical decisions in

various care settings. Systematic reviews provide the highest level of evidence in support of clinical recommendations.

*Scoping Review*

Some research questions cannot be readily answered due to the little evidence available in the literature. This is often the case when a topic of interest is heterogeneous and complex in nature (134). A scoping review is the preliminary assessment of the potential size and extent of the available research; it aims to identify the nature and range of the research evidence (135). The aim is to inform readers of the current knowledge gaps present and potential avenues for future research around the topic. Critical appraisal of the strength of evidence and risk of bias assessment is usually not carried out in scoping reviews. The extraction of data for a scoping review may include a charting table or form but a formal synthesis of findings from individual studies and the generation of a "summary of findings" table is usually not performed. Results often include a logical diagram or framework or a descriptive form that aligns with the scope and objectives of the review. It usually incorporates numerical summaries and qualitative thematic analysis.

Following our preliminary assessment of acute pain care services in the community setting, we have noted a lack of evidence in the literature regarding CP interventions or practices in the management of adults' acute pain. A scoping review represents the ideal knowledge synthesis tool to determine the scope of the body of literature regarding CPs practices and barriers to current acute pain management practices for adults. The methodology and synthesis within a scoping review are flexible enough to synthesize both qualitative and quantitative data into diagrams, tables, and descriptive forms of analysis that align with the scope and objectives of the review (e.g., numerical summary, a summary of findings, qualitative thematic analysis, etc.) (136, 137).

### 3.2 Protocol and Registration

Our scoping review was registered with the Open Science Framework (OSF) Registries on November 15th, 2021[ Web address: https://osf.io/8cs2z/ ] and was executed according to the methodological framework proposed by Arksey and O'Malley and the Joanna Briggs Institute (JBI) methodology for scoping reviews (136-138). It was presented on OSF as an open-ended public registration project covering subjects such as community health and preventive medicine, medical specialties, medicine, public health, geriatrics, and pharmacy and pharmaceutical sciences. This scoping review was reported following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Extension for Scoping Reviews (139).

### 3.3 Information Sources & Search Strategy

We consulted an experienced medical librarian from the McConnell Resource Center Medical Library at the McGill University Health Centre to develop a computerized literature search strategy for identifying relevant studies that best reflect the aims of our scoping review. This strategy involved the use of relevant MeSH terms and keywords (See appendix 1 for a list of search terms). With the selected MeSH terms and keywords, an initial robust search was performed on Medline [via Ovid] in September 2021, further developed and iteratively validated. After five iterations, the search strategy was finalized for Medline (See appendix 2.1). We, then, translated this complete comprehensive search into each of the following electronic databases: Embase, Scopus, Cochrane Library, and CINAHL. Using the Emtree terms, we finalized the Embase search strategy [via Ovid] in September 2021, as well as the Scopus [via Elsevier], Cochrane Library [via Wiley], and CINAHL [via EBSCO] search strategies in October 2021 (See appendices 2.2 – 2.5).

Subsequently, an analysis of the text words contained in the title and abstract of retrieved papers and the index terms used to describe the studies was performed. As a result of this analysis,

the identified keywords and index terms were used for a second search on all the previously mentioned databases and included: acute pain, postoperative pain, low back pain, dental pain, community pharmacist, community pharmacy, pharmaceutical services, opioid, analgesic, non-opioid, and OTC recommendation (s). There was no language exclusion. We did not search the grey literature.

### 3.4 Eligibility Criteria

#### 3.4.1 Study Concepts

This review was limited to studies exploring (i) the role of CPs (independently or as part of a multidisciplinary clinical care team); (ii) current practices and interventions used by CPs; and (iii) barriers and facilitators to CPs managing acute pain in adults. Among the potential medical subject headings (MeSH terms) that were investigated, the main concepts we prioritized in our search strategy consisted of a combination of Pain/Acute Pain, Pharmacists/Community Pharmacists, and Intervention/Program. MeSH terms are traditionally used for indexing, cataloging, and searching health-related information in large databases including Medline or PubMed. Each database has its form of medical subject headings that are used to build focused searches with the goal of finding relevant citations (140). Any studies that deviated from our identified list of primary concepts were excluded. This includes studies focused on chronic conditions, chronic pain management, disease management, chronic opioid use, opiate substitution treatment, the opioid crisis, opioid misuse and abuse, clinical pharmacists, inpatient care, adults in long-term care, and palliative care. We restricted our search to studies published after 1990, as any earlier publications were less likely to reflect current acute pain care practices.

#### 3.4.2 Participants

Studies involving human participants aged 18 years and older, without restriction on sex, gender

or race, were considered and included adults with acute pain secondary to a recent medical condition (e.g., acute dental pain/toothache, acute low back pain, neck pain, postoperative pain, myalgia, breakthrough pain, renal colic, acute abdominal pain, fracture, and/or musculoskeletal injury). Any studies involving participants less than 18 years of age as well as adults presenting with either chronic pain or chronic pain secondary to chronic painful conditions (e.g., osteoarthritis, cancer, and migraines/headaches) were excluded (Table 1). We only considered studies with patients sampled from the following settings: residences for autonomous seniors, outpatient, and community pharmacy settings (excluding inpatient and long-term care settings). In Canada, community pharmacies are privately owned businesses that either belongs to a chain or a banner corporation, are operated independently by individuals, or are embedded into food and mass merchandisers (141).

**Table 1:** Selection criteria for studies addressing CP practices or interventions in acute pain management

| | INCLUSION | EXCLUSION |
|---|---|---|
| **POPULATION** | • Women and men ≥ 18 years (any race and ethnicity)<br>• Adults with acute pain secondary to recent medical condition: Acute dental pain/toothache, postoperative pain, acute low back pain, neck pain, breakthrough pain, myalgia, renal colic, acute abdominal pain, fracture, musculoskeletal injury<br>• Acute pain care, post-acute care, community pharmacy, residential (residences for autonomous seniors), & outpatient settings | • Participants <18 years old<br>• Animal studies<br>• Adults with chronic pain or chronic conditions (e.g., osteoarthritis, cancer, and migraines/headaches)<br>• Chronic opioid use<br>• Opioid crisis and/or opioid toxicity topics<br>• Adults in long-term care facilities, and inpatient settings |
| **INTERVENTION** | • Studies that describe and/or evaluate:<br>- CPs' therapies/interventions/practices aimed at managing acute pain in adults<br>- CPs' patient health education (tools) aimed at managing acute pain in adults<br>- Use of opioids, analgesics including NSAIDs, morphine and tramadol in community pharmacy practices for acute pain<br>• All studies will be including primary studies and/or systematic or narrative reviews | • Interventions/practices provided in hospital/ED and/or inpatient settings<br>• Chronic pain management practices/interventions/programs<br>• No CP involvement<br>• Use of opioid management programs for chronic pain: Methadone, naloxone, fentanyl, benzodiazepine, sedatives, hypnotics, buprenorphine, and heroin |
| **COMPARATOR** | • With or without a comparator group | - |
| **OUTCOMES** | • Primary outcome: Knowledge, behaviors, practices, and interventions of CPs for acute pain management | • Outcome data relating to concepts or data outside of the scope of this review |

### 3.4.3 Types of Study Designs

We included quantitative experimental and observational studies, qualitative studies and mixed methods studies and relevant scoping and systematic literature reviews. Any study that represented the wrong study design or was a study protocol (e.g., presenting the methods only) was excluded.

### 3.4.4 Practices and Interventions considered

Studies were considered eligible if they described and/or evaluate CPs' practices, interventions, and therapies aimed at managing acute pain in adults. This includes the involvement of pharmacists providing post-discharge acute pain management services in various outpatient settings such as retail pharmacies and pharmacy residencies. These services could range from CPs' patient health education, patient counselling, referrals to HCPs, point-of-care tools for acute pain management, and non-pharmacological strategies to recommendations for opioids/analgesics. Interventions involving opioid stewardship were focused on opioids, non-opioids, and/or OTCs provided for acute pain in community pharmacy practices. However, opioids prescribed or recommended for chronic use or chronic pain management were excluded. We reviewed the management of acute pain which could be secondary to fractures, acute dental pain/toothache, postoperative pain, acute low back pain, acute back pain, breakthrough pain, myalgia, neck pain, renal colic, acute abdominal pain, and musculoskeletal injuries.

### 3.4.5 Outcomes

The primary outcomes included: knowledge, behaviours, practices and interventions of CPs and barriers and facilitators-solutions to acute pain management.

## 3.5 Selection of Sources of Evidence

All identified articles from the five databases were collated and uploaded into the Covidence software library (i.e., imported from EndNote X9 1.1 [Clarivate Analytics, Pa., USA]), and

duplicates were removed. A pilot screening session was conducted with the 2 reviewers (KA & KK) prior to study selection to ensure the accuracy and reliability of the screenings (using a predefined standardized screening form based on the eligibility/selection criteria on a random sample of 25 and 50 titles/abstracts) (138).

The titles and abstracts were screened independently by two trained reviewers (KA & KK) for assessment against the eligibility criteria for the review (139, 142, 143). Any disagreements between reviewers were resolved through consensus or referral to a third independent reviewer (SNM) who is knowledgeable in the research area. Any reasons for the exclusion of titles and abstracts were recorded and reported.

Following the initial abstract screening, the final list of eligible articles was retrieved in full text with their citation details imported into the Covidence software and then screened by reviewers against the eligibility criteria (as listed above). Once again, disagreements between reviewers were resolved by consensus with a third reviewer and any reasons for the exclusion of the full-text articles were agreed upon and recorded. Reasons for exclusion of full-text articles included wrong intervention (e.g., chronic pain management, chronic pain treatments, no CP involvement, etc.), wrong outcomes (e.g., pain assessment, risk stratification, pain screening, outcomes not related to pain, etc.), wrong setting, wrong study design, wrong patient populations, inability to retrieve full-text, etc. Lastly, to ensure literature saturation, a third hand-search of the reference lists of all selected articles was performed. Regular meetings were held weekly between reviewers and monthly with all authors to review the evidence collected.

### 3.6 Data Charting Process

Once the selection of eligible full-text studies was completed, reviewers charted the data. This process involved extracting the relevant information from the included studies and presenting the

results using structured figures and tables to create a descriptive summary of the data collected which addresses the scoping review's aims and objectives.

Two reviewers (KA & KK) attended a pilot training session where they piloted a customized data extraction instrument integrated into the Covidence and Endnote software (see Appendix 3 for the data extraction tool) on a sample of 10 articles [Trial pilot testing stage performed in December 2021]. This data extraction form was developed based on the JBI's recommended scoping review data extraction tool for study details, characteristics, and results extraction to reduce any potential bias and ensure validity and reliability during the extraction**.**

The two reviewers then independently conducted the extraction of the abstracted data using the piloted data extraction form and summarized the study design characteristics, participant characteristics, CP characteristics, and CP engagement characteristics. Any discrepancies in the extracted data were resolved either through consensus between reviewers or by the involvement of a third reviewer if required. As customary for scoping reviews, a formal assessment and critical appraisal of the methodological quality of included studies was not performed. A PRISMA flow diagram was developed to describe the flow of information through the different phases of the scoping review. The findings of the review were presented and charted according to the following sections: study aim(s) and/or objective(s), study design, study populations, study setting, interventions, practices, outcomes measured/reported, as well as key findings.

### 3.7 Synthesis of Results

The results of this scoping review were synthesized quantitatively by using numerical counts of the findings and qualitatively by conducting a thematic framework analysis (144). The data collected was then transferred from the Covidence software into an Excel spreadsheet for analysis.

In addition, the results were accurately presented in a tabular and diagrammatic mind map such that it aligns with the aims of this scoping review.

*Quantitative numerical frequency analysis*

A numerical frequency analysis is acknowledged as a widely used method to measure quantitative aspects of behaviour by converting data from qualitative and/or quantitative variables into grouped data (145). This data analysis process required tallying the frequency of the abstracted data characteristics listed above including the year of publication, the study locations, study designs, acute pain conditions, the CP interventions in acute pain management, etc. Following this, averages, frequencies, and standard deviations were computed for each characteristic listed above to examine and compare the lowest occurrence and highest occurrence within the abstracted body of literature analyzed.

*Qualitative thematic framework analysis*

We utilized a thematic framework analysis, a qualitative method, to identify themes and subthemes in the data originating from the included articles. Qualitative analysis systemically identifies, maps, and provides a clear insight into the patterns of key findings and terms across a data set (146). Using the latest NVivo 13 software, we extracted the relevant data in the form of quotes (extracts from the studies) and then categorized them into sets of codes which were combined into appropriate themes and sub-themes. We followed the 6-phase process delineated by Braun and Clarke in our methodology (147). This analysis was constructed to capture three sets of categories of themes and their respective subthemes for CPs and adults. Once the coding and systemic analysis of the qualitative data was completed, we developed a thematic mind map characterized as a visual tool that maps out the major themes, sub-themes, and interconnections between them as well as a thematic table where the candidate themes and sub-themes were collated with their

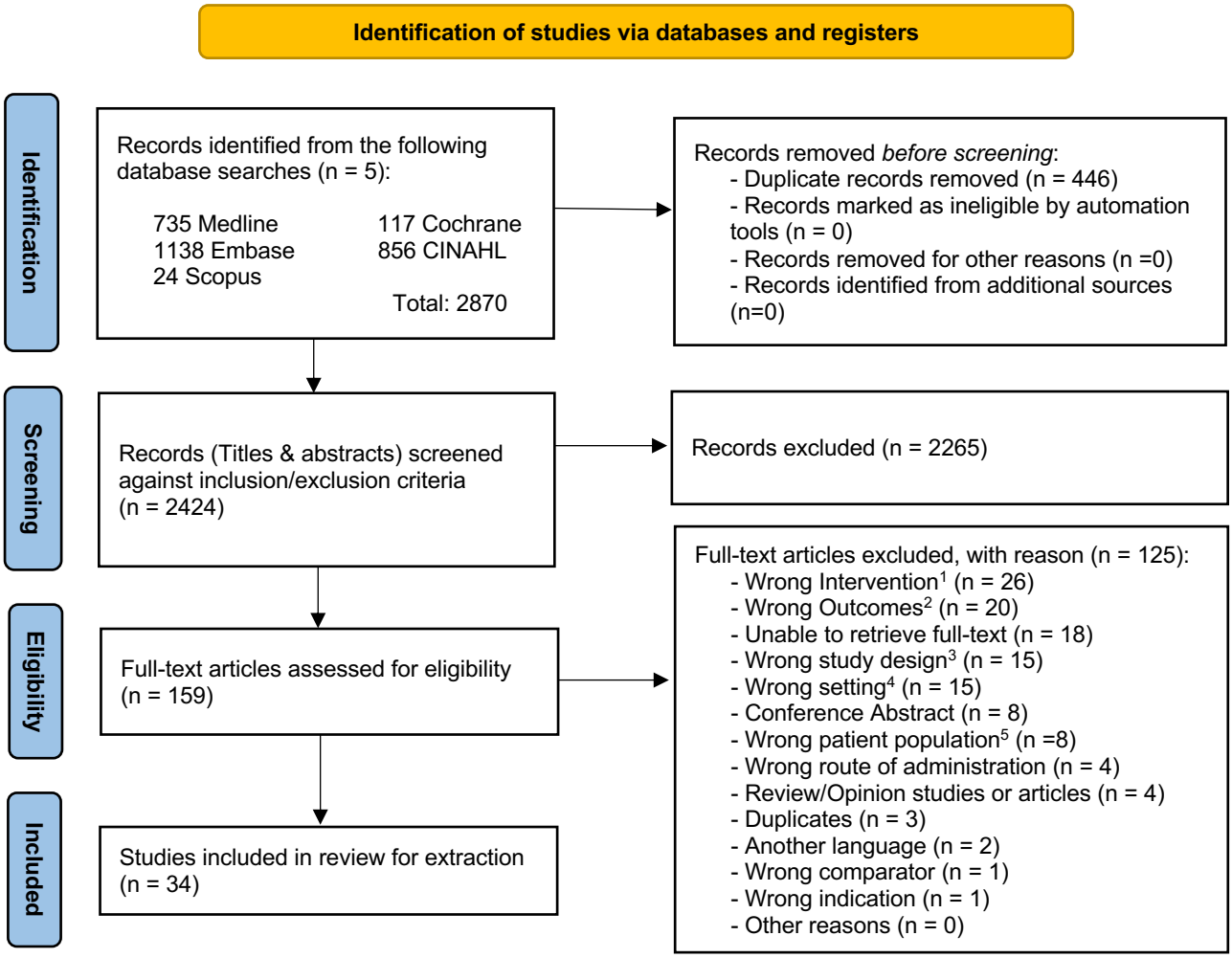
respective data extracts.

Informed by the quantitative and qualitative results of the above work, we determined the extent and gaps of the research available with regard to evidence-based acute pain management practices and interventions utilized by CPs for adults and the barriers with their respective solutions to CP's delivery of the identified acute pain management services and adults self-managing their acute pain in community settings.

# Chapter 4: Results

## 4.1 Selection of Sources of Evidence

A total of 2870 records were identified from the five database searches. As shown in Figure 1, following the removal of duplicates and exclusions, we reviewed 159 full-text articles of which 34 studies were eligible for extraction. No additional articles were identified through hand-searching reference lists. Table 2 describes the 34 studies selected for review.




1. Wrong intervention: Assessing chronic pain, managing chronic pain, study does not involve community pharmacists, and intervention(s) or practice(s) provided by individuals not working in a community pharmacy/emergency department/outpatient setting.
2. Wrong outcomes: Pain assessment, risk stratification, pain screening, opioid use, opioid risk assessment, no outcome data relating to concepts or data that could not be extracted.
3. Wrong study design: Editorials, protocol/methods only, ongoing studies, opinion and review articles.
4. Wrong setting: Studies conducted in setting other than retail pharmacies, residential aged care facilities, ambulatory clinics, and pharmacy residencies.
5. Wrong patient population: patient population mean age <18 and adults with chronic pain (e.g., chronic conditions, chronic cancer pain, migraine/headache).

**Figure 1.** PRISMA flow diagram of studies through review process describing community pharmacists' engagement in the management of acute pain in adults

**Table 2.** Studies identified describing community pharmacists' practices and interventions

| Author, Year, & Country | Study Design | Population Characteristics | Pain Condition | Practice or Intervention | Outcomes |
|---|---|---|---|---|---|
| Abdel Shaheed et al. 2014 Australia | Observational cross-sectional study | - n = 30 pharmacists with training for the low back pain (LBP) clinical trial | - Acute LBP | - Educational open-ended questionnaire framed to draw pharmacists' opinions. Example of topics of practice addressed: Paracetamol, non-steroidal anti-inflammatory drugs (NSAIDs), rest, Referral to general practitioner (GP), rubefacient, ice, avoid risks, activity, heat, physiotherapy, codeine (combination), and back support | - Pharmacists' views, experiences and challenges towards acute LBP practices |
| Abdel Shaheed et al. 2016 Australia | Observational cross-sectional study | - n = 30 pharmacists | - Acute LBP | - Open-ended questionnaire relating to pharmacists' demographic variables, disease state management (DSM) services, pharmacists' management of LBP, and experiences while practicing in the clinical trial | - Pharmacists' views on implementing a care program for people with acute LBP in the community pharmacy |
| Abdel Shaheed et al. 2016 Australia | Observational cross-sectional study | - n = 534 primary care pharmacies (336 for the non-specific LBP [NSLBP] and 198 for the fracture scenarios) | - Uncomplicated case of acute non-specific LBP<br>- Vertebral compression fracture | - Simulated Patient Scenarios: A researcher playing the role of a patient with a pain condition (Uncomplicated case of acute (<6 weeks) NSLBP in a middle-aged man & vertebral compression fracture in an elderly woman with a cluster of red flags) presented themselves with a standardized case information and recording the CPs healthcare advice/recommendations | - Management recommendations for LBP and concordance with clinical evidence-based practice guidelines |
| Abdu-Aguye et al. 2017 Zaria, Nigeria | Observational cross-sectional study | - Cross-sectional survey: n = 40 retail drug outlets<br>- Semi-structured interviews: n = 7 drug sellers | - Hypothetical non-specific pain conditions (musculoskeletal pain states) and 26-year-old male with LBP (Acute onset low back pain) | - Simulated patient visits: To assess the quality of care obtained from retail drug outlets located within communities. Combined with feedback from a cross-sectional survey & semi-structured interviews as a means of promoting rational utilization of over-the-counter (OTC) medicines (Ex: perceptions and knowledge of aspects of analgesic use | - Knowledge, attitudes and practices of OTC analgesic use for musculoskeletal pain states |

| | | | | | |
|---|---|---|---|---|---|
| | | | | exploring their knowledge of NSAIDs pain presentation and patient types) | |
| Ayele et al. 2018 Ethiopia | Observational cross-sectional study | - n = 66 simulated visits<br>- n = 13 CPs were interviewed | - Minor ailments (example: Scenario 1: lower back pain) | - Simulated patient (SP) visits combined with a qualitative study using in-depth interviews covering assessment of medical condition, analgesic recommendations (example: paracetamol, NSAIDs, or weak opioids), non-pharmacological recommendations, referrals, and barriers to the provision of management services for minor ailments | - Management of minor back pain by CP and perceived barriers to provision of back pain services |
| Bawazir et al. 2014 Saudi Arabia | Observational cross-sectional study | - n = 141 pharmacists | - Toothache, ulcers, mouth malodor, dental abscess, and bleeding gums | - Cross-sectional survey (closed-ended questions covering 5 sections) was used to assess the knowledge and attitudes of CPs regarding oral healthcare and oral hygiene | - Knowledge and attitudes of pharmacists regarding oral healthcare and oral hygiene products |
| Bhati et al. 2014 North Western Region of England | Observational cross-sectional study | - n = 133 dentists<br>- n = 76 pharmacists<br><br>- n = 129 patient interviews<br>- n = 149 adult interviews | - Toothache | - Questionnaires were circulated to all dentists and pharmacists investigating information on which OTC analgesics (ranking) are recommended and overall use (example: aspirin, ibuprofen, paracetamol, aspirin and codeine, paracetamol and codeine, and a topical agent-clove oil)<br>- Semi-structured Interviews: two groups of the public were interviewed on their preference for an OTC analgesic for toothache relief. | - Pharmacists' OTC analgesic preferences and recommendations for oral health issues |
| Siang Chua et al. 2006 Malaysia | Observational cross-sectional study | - n = 100 CPs | - Acute back pain | - Simulated Patient Study: The researcher presented themselves to the CP as a patient and asked for a medication to treat lower back pain for her grandfather. A set of questions would be asked as prompts for the pharmacist to ask more patient-oriented questions before recommending a treatment. All information was recorded. | - CPs' counselling practices for back pain |
| Dabbous et al. 2020 | Observational cross-sectional study | - n = 320 CPs | - Acute or chronic low back pain | - Multi-center cross-sectional questionnaire for CPs to complete that investigates the demographic variables | - Knowledge, attitude and reported practice of the CPs advising people with low back |

| | | | | | |
|---|---|---|---|---|---|
| Lebanon | | | | about the respondent, their knowledge and attitude towards low back pain, and recommended treatments that reflect and characterize the nature of practice. | pain |
| Denyer et al. 2012 United-Kingdom | Observational cross-sectional study | - n = 448 questionnaires (Groups: chiropractors, osteopaths, acupuncturists, pharmacists, physiotherapists , general practitioners) | - Neck, shoulder, and upper arm pain | - A cross-sectional survey (The Beliefs about Risks and Benefits of Treatments Questionnaire) of healthcare practitioners in the United-Kingdom comparing the views of all healthcare providers (traditional- and CAM [complementary therapies]-trained) on exemplar neck, shoulder, and upper arm pain to explore the perceived risks and benefits of different types of therapeutic intervention using a mathematical cluster approach | - Comparison of the views of different healthcare practitioners about traditional and alternative approaches to assess barriers (perceived risks and benefits) to effective integration |
| Dube et al. 2018 Quebec, Canada | Observational cross-sectional study | - n = 542 pharmacists | - Acute and chronic non-cancer pain | - An online survey was carried out among pharmacists practicing in the province of Quebec, Canada. This survey would examine the experiences of community pharmacists in relation to opioid prescribing and dispensing with a focus on optimizing collaboration and communication | - Experiences of CPs in relation to opioid prescribing and dispensing with a focus on communication with other healthcare professionals. |
| Giua et al. 2020 Italy | Observational cross-sectional study | - n = 872 patients<br>- n = 12 CPs collectively named “The SIFAC Group of clinical Community Pharmacists” | - Acute and chronic LBP | - A quantitative questionnaire was submitted by CPs to the patients visiting their pharmacy to assess the LBP intensity and disability degree in patients and the attitudes they have toward pain management by pharmacological and non-pharmacological strategies<br>- CPs participated in an educational workshop divided into two sections. | - Assessment of LBP intensity and disability degree in patients and their attitudes toward pain management |
| Hunt et al. 2007 Ontario, Canada | Observational cross-sectional study | - n = 1 | -Musculoskeletal pain in the knees and hips. | - Educational needs assessment and 1-on-1 interviews with family physicians, a gastroenterologist, a hepatologist, an internist, a rheumatologist, and a pharmacist to solicit unprompted feedback on the self-reported issues | - Assessment on pain management and the safety of commonly used analgesics for patients with musculoskeletal pain and concordance with evidence-based guidelines |

| | | | | | |
|---|---|---|---|---|---|
| Maunder et al. 2005 United-Kingdom | Observational cross-sectional study | - n = 17 pharmacies | - Short-term dental pain | - Semi-structured questionnaire and interviews used to determine the existing practices in oral healthcare advice, products, and information provided by community pharmacies | - Assessing the current role of CPs in oral healthcare (example: advice, products and information provided) |
| Mishriky et al. 2019 Australia | Observational cross-sectional study | - n = 113 CPs | - Pain and fever | - An online self-administered cross-sectional survey was sent out to CPs to complete anonymously (educational assessment) | - Pharmacists' views, practices, and treatment recommendation in pain and fever management, and concordance with clinical guidelines and training |
| Mishriky et al. 2020 Australia | Observational cross-sectional study | - n = 120 adults from community pharmacies | - Pain | - Pre-tested anonymous self-administered questionnaire completed by participants recruited from community pharmacies | - Knowledge and practices of Australian adults experiencing pain, and their views of community pharmacy pain management services |
| Mishriky et al. 2021 Australia | Observational cross-sectional study | - n = 176 CPs | - Acute non-specific LBP | - A cross-sectional prospective exploratory survey to assess the views and practices of Australian CPs in LBP management (open to all practicing CPs across Australia). | - Pharmacists' views, practices, and recommendations in LBP of different severities in concordance with current clinical guidelines along with the accessibility and use of clinical LBP resources |
| Priya et al. 2007 Chennai, City, India | Observational cross-sectional study | - n = 50 pharmacists | - Oral disease, mouth ulcers, or persistent soreness | - A closed-ended cross-sectional survey addressing the vicinity of the dentist to the pharmacy, the frequency of pharmacist-dentist interaction, the range of dental products, advice given by the pharmacist to customers regarding oral hygiene products & oral health, pharmacists' source of information regarding oral health and oral hygiene, the barriers, and methods to improve their knowledge and attitudes regarding oral health | - Pharmacists' knowledge and attitudes toward oral health care and oral hygiene products |
| Silcock et al. 2007 United-Kingdom | Observational cross-sectional study | - n = 335 community pharmacists | - Acute non-specific low back pain (LBP) | - An anonymous questionnaire self-completion by pharmacists attending continuing education sessions (on back pain treatment including pain advice, OTC advice, demographic variables, attitudes towards back pain and its | - Pharmacist's attitudes, knowledge, and evidence-based practice when presented with patient with acute or chronic LBP |

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| | | | | treatment, frequency, and quality of back pain advice in the pharmacy, clinical case studies (2 vignettes), and education and training needs) | |
| Taing et al. 2016 Australia | Observational cross-sectional study | - n = 144 community pharmacists | - Mouth ulcers, oral-related pain, oral thrush, toothache, gum problems, and broken teeth | - Online questionnaire was sent to CPs to explore pharmacist practices in relation to oral health and associated oral healthcare products in community pharmacies<br>- Interventions discussed include analgesic medication to relieve oral-related and advice | - Pharmacist's attitudes, beliefs, and practices towards oral health as well as the frequency and nature of consumer enquiries relating to oral health |
| Wood et al. 2018 Australia | Observational cross-sectional study | - n = 904 Pharmacists | - Mild- to-moderate pain | - Two interactive online clinical tools to aid management of patients who presented requesting OTC combination analgesics containing codeine (CACC) were developed (course of management and referral for patients based on evidence-based best practice with a focus on local resources and services)<br>- A multiple-choice assessment was added, and a template developed for implementation into practice A cross sectional survey that investigated the utilization of the tools was distributed to familiarize pharmacists with the tools | - Evaluate usability of an online interactive clinical tool and/or clinical information (online PDF-based platform) for managing OTC CACC requests and codeine dependence |
| Inch et al. 2016 United-Kingdom | Observational study | - n = 18 pharmacies | - Minor ailments (example: back pain) | - Simulated patient (SP) visits to community pharmacies where they explore the appropriateness of the management of minor ailments recommended by CPs | - Appropriateness of minor ailment management in community pharmacies |
| Stewart et al. 2017 United States | Longitudinal observational study (before-after design) | - n = 89 patients | - Dental pain/toothache | - This observational study used a retrospective chart review of opioid prescriptions written by dental providers practicing in a free dental clinic for the medically underserved over a period of 74 months. Pharmacy services were fully integrated into the practice model. The collaborative discussion between the dentist and pharmacy team typically | - Comparison of prescribing rates between periods of full and partial integration of pharmacy services and periods of no integration as well as the assessment of the collaboration between pharmacists and dentists |

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| | | | | addressed issues related to drug interactions, allergies, dosing, the potential for nonopioid alternatives, and adherence to the clinic's opioid policy | |
| Dineen-griffin et al. 2019 Australia | Cluster randomized controlled trial (RCT) | - n1 = 894 patients receiving Minor Ailment Services and Usual Care<br>- n2 = 30 pharmacies were included with 55 pharmacists | - Reflux, cough, common cold, headache (tension or migraine), primary dysmenorrhoea, or low back pain | - Minor Ailment Service (MAS) Intervention: To evaluate the impact of an enhanced service compared with current practice. A standardised consultation for pharmacist-patient intervention where patients received structured face-to-face consultation at the pharmacy (service offering, clinical assessment, standardized management, and documentation and follow-up plan<br>- Use of Integrated technology platforms such as HealthPathways (protocolized evidence-based clinical care pathways specific to each ailment) and HealthLink (a direct secure messaging system allowing for bidirectional communication between the CP and the GP) | - Evaluating the clinical and humanistic impact of a community pharmacy led-MAS relative with usual pharmacist care (UC) |
| Slater et al. 2013 Australia | Cluster RCT | - n = 317 pharmacy consumers (Groups: pamphlet + education, pamphlet only, usual care) | - Low back pain (specific or non-specific LBP) | - Cluster-randomised controlled trial: To determine the effectiveness of an evidence-based, pamphlet (Key intent: for consumers using the pamphlet in a real-world setting to self-identify as having LBP) and education intervention in improving low back pain-related beliefs among pharmacy consumers | - Effectiveness of an evidence-based, pamphlet intervention in reinforcing LBP-related beliefs in pharmacy consumers |
| Hay et al. 2006 United-Kingdom | RCT | - n = 325 adults | - Knee pain | - Interventions: enhanced pharmacy review (algorithm directed pharmacological management); community physiotherapy (advice about activity and pacing and an individualised exercise programme); control (advice leaflet and telephone call) | - Effectiveness of an evidence-based pharmacy review and community physiotherapy strategies for older adults with knee pain |
| Marra et al. 2012 Canada | RCT | - n = 73 for PhIT-OA intervention care | - Knee pain (pain, aching, or stiffness in or | - Intervention care included a validated knee osteoarthritis (OA) screening questionnaire, education, pain medication management, | - Effectiveness of an intervention compared to usual care delivered by community pharmacists with the |

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|---|---|---|---|---|---|
| | | - n = 66 for usual care | around the knee(s)) | physiotherapy-guided exercise, and communication with the primary care physician. Usual care consisted of an educational pamphlet | assessment of global pain, pain, function and quality of life scores |
| Phelan et al. 2008 United-Kingdom | RCT | - n = 106 patients | - Knee pain, muscle pain, stiffness | - A structured medicines review was conducted by a pharmacist in the general practice setting for patients with knee pain (+55yo). This intervention included one-on-one consultations. Treatment recommendations based on algorithms were made and education and advice on medications and lifestyle changes were offered. Control group received an information leaflet and telephone call | - Content description and effectiveness of pharmacist-led medication review for management of knee pain in older adults |
| Abdel Shaheed et al. 2015 Australia | Quasi experimental cross-sectional study | - n = 335<br>- Groups include clinical trial pharmacists, workshop pharmacists, & control pharmacists | - Acute low back pain (LBP) | - One-hour one-on-one training session delivering information on the evidence-based management of LBP, screening for red flag conditions, and screening for eligibility into the trial<br>- Two-hour workshop on evidence-based management of LBP<br>- A 25-item Pharmacists' Back Beliefs Questionnaire (PBBQ) was used | - Pharmacists' knowledge, attitudes, and beliefs towards LBP |
| Downie et al. 2020 Australia | Quasi-experimental study (after-only design) | - n = 5 practicing CPs<br>- A total of 162 statements between pharmacists and "clients" were logged | - Non-serious low back pain (LBP), osteoporotic compression fracture, and leg pain | - A clinical decision support system (CDSS) was developed for pharmacists to assist in determining care plans for treating LBP in CP setting<br>- Cross-platform Web app using an iterative user-centered design process to uncover pharmacist training and procedural constraints that may impact pharmacist decision making for LBP | - Effectiveness, pharmacist-reported usability and acceptance of a CDSS prototype system as part of first-line care of LBP in a community pharmacy |
| Vella et al. 2009 Malta | Quasi-Experimental Study (After-only design) | - n = 10 community pharmacies | - Headache and back pain | - Two flow-chart protocols, for headache and back-pain management. The protocols address patient identity, pain score, a prescription sheet, statements detailing the most encountered headache or back-pain conditions, a treatment that outlined the management | - Assessment of practicality and applicability of the two flow-chart protocols in terms of pharmacists' management for headache and back pain |

| | | | | | |
|---|---|---|---|---|---|
| | | | | of the condition, and an explanatory description to support the presentation of the condition(s) and the flow chart(s) | |
| Abdel Shaheed et al. 2014 Australia | Non-experimental cross-sectional design | - n = 193 CPs | - Acute LBP | - Educational Workshop (Case-based learning): 2-h educational workshop with a questionnaire (assessing their knowledge following the workshop) on the evidence-based management of LBP covering the LBP care pathway, simple screening strategies, & guidelines. | - Pharmacists' knowledge and satisfaction of the educational workshop content on the evidence-based management of LBP |
| Mishriky et al. 2020 Australia | Knowledge synthesis study | - | - Low back pain (LBP) | - A narrative review addressing current Australian and international LBP management guidelines | - Impacts of LBP, current evidence on LBP management guidelines (Paracetamol vs. NSAIDs use), and pharmacists' roles and interventions in a primary care setting |
| Perrot et al. 2019 France | Knowledge synthesis study | - n = 480 publications screened, and 20 studies analyzed | - Acute pain, chronic non-malignant pain, headache/migraines | - Narrative Review investigating risks and drivers associated to self-medication in pain management, strategies to improve self-medication, pharmacist's intervention in analgesic OTC use, and patient counseling in a community pharmacy setting | - Investigate and analyze the state-of-the art of pharmacists' role in pain management self-medication |

- NSLBP: non-specific low back pain; NSAID: non-steroidal anti-inflammatory drug; CP: community pharmacist; GP: general practitioner; DSML: disease state management; OTC: over-the-counter; SP: simulated patient; CAM: complementary therapies; PCA: multimodal cluster approach; CACC: combination analgesics containing codeine; MAS: minor ailment service; UC: usual care; OA: osteoarthritis; PBBQ: Pharmacists' Back Beliefs Questionnaire; CDSS: clinical decision support system

### 4.2 Characteristics of Selected Studies

The types of study design of the included studies are described in Tables 2 and 3. Most studies were observational cross-sectional studies (n = 22, 65%) (Table 3). Experimental studies accounted for 26% of included studies. Lastly, two (6%) narrative reviews were identified. Sample sizes were variable (Table 2)

**Table 3**. Methodological designs of studies retrieved

| Number of studies (n) | 34 |
|---|---|
| Observational Studies, n (%) | |
| Cross-sectional | 22 (65) |
| Longitudinal, retrospective | 1 (3) |
| Experimental Studies, n (%) | |
| Randomized controlled trial (RCT) | 3 (9) |
| Cluster-RCT | 2 (6) |
| Quasi-RCT | 3 (9) |
| Non-experimental cross-sectional | 1 (3) |
| Knowledge Synthesis Studies n (%) | |
| Narrative reviews | 2 (6) |

The distribution of studies according to the year of publication, study location, and acute pain experience (s) or condition (s) of community pharmacy visits is described in Table 4. Seventy-six percent of the included studies involving CP engagement in acute pain management interventions were published from 2010 to 2021 and most were conducted in Australia (n = 14, 41%), and the United Kingdom (n = 7, 21%); whilst a minority were conducted in other countries. The most frequent acute pain conditions reported included acute non-specific low back pain (LBP) (n = 17), dental pain (e.g., toothache, mouth ulcers, gum bleeding, pain from post-wisdom teeth removal, etc.) (n = 6), and musculoskeletal injury (e.g., muscle pain, knee pain, stiffness, fractures, etc.) (n = 8).

**Table 4**. Distribution of studies according to year of publication, study location, and acute pain conditions

| | |
|---|---|
| Number of studies (n) | 34 |
| Publication year, n (%) | |
| 1990-1999 | 0 |
| 2000-2009 | 8 (24) |
| 2010-2021 | 26 (76) |
| Study location (continent), n (%) | |
| United States (US) | 1 (3) |
| Canada | 3 (9) |
| United-Kingdom (UK) | 7 (21) |
| Australia | 14 (41) |
| Africa | 2 (6) |
| Other (e.g., eastern Asia, western Asia, and rest of Europe) | 7 (21) |
| Pain experiences/conditions (n)* | |
| Acute non-specific low back pain | 17 |
| Postoperative pain | 1 |
| Dental pain (ex: toothache, mouth ulcers, gum bleeding, etc.) | 6 |
| Musculoskeletal Injury (ex: muscle pain, knee pain, stiffness, fractures etc.) | 8 |
| Other pain condition(s) | 6 |

* Certain studies examined more than one pain condition

### 4.3. Synthesis of Results

#### 4.3.1 Numerical Frequency Analysis - CPs practices or interventions in acute pain management

CP practices or interventions designed to manage acute pain condition (s) were categorized into two levels: interventions directed at pharmacists (CP-targeted) and interventions directed at patients (patient-targeted) (Table 5).

##### 4.3.1.1 CP-targeted practices and interventions in acute pain management

*Professional educational programs*

CP-targeted professional educational programs were multi-structured programs [n = 7] presented with an interactive educational approach (Table 5). The educational design aimed to first assess

and then improve the current acute pain-related knowledge base and increase the responsibilities of CPs in guiding adults to self-manage their acute pain. In-person or via online questionnaires aimed to assess knowledge on OTC analgesics, multimodal analgesia therapies, non-pharmacological therapies, self-care advice, assessment of acute pain, referrals, communication with other HCPs, etc. (148, 156-160, 162) The subsequent interactive components involved semi-structured interviews, educational workshops or training sessions following the completion of the quantitative questionnaires (156-160, 162). The outcomes assessed throughout this intervention include CPs current and acquired knowledge, responsibilities, preferences, views, experiences, and recommendations towards acute pain conditions, acute pain assessment, and acute pain management practices (e.g., pharmacological and non-pharmacological strategies, the safety level of treatment options, concordance with evidence-based clinical guidelines, etc.).

**Table 5**. Identified CP- and patient- targeted practices/interventions in acute pain management

| Number of studies (n) | 34 |
|---|---|
| CP-targeted interventions* | |
| Professional Educational Programs | 7 |
| Educational Simulated Patient Scenario Visits | 5 |
| Interactive Electronic Tool (ex: clinical decision support system [web app], *HealthLink* messaging system between HCPs, etc.) | 3 |
| Evidence-Based Practice Guidelines for Management of Acute Pain (ex: handbooks, flow chart algorithms, pain protocol guidelines, etc.) | 2 |
| Patient-targeted interventions* | |
| Patient Counselling (ex: one-on-one consultations, pharmacy medication/enhanced pharmacy review, minor ailment service intervention, Over-The-Counter analgesics management, screening assessment, referrals etc.) | 19 |
| Provision of Self-Care Advice (ex: non-pharmacological therapies, stay active, physical exercises and avoid bed rest) | 6 |
| Educational pamphlets/leaflets | 4 |

* Certain studies examined more than one intervention

*Simulated patient scenario visit*

Educational simulated patient scenario visits were conducted by researchers playing the role of an adult (i.e., simulated customer or patient) with an acute pain condition, for instance, acute non-specific LBP, vertebral compression fracture, or musculoskeletal pain states along with a cluster of "red-flag" symptoms (Table 5) (161, 163-166), as a means of educating the CP on appropriate management of these conditions.

*Interactive electronic tools*

Three studies reported the use of interactive electronic tools by CPs to help adults manage mild-to-moderate acute pain, low back pain, leg pain, and an osteoporotic compression fracture (Table 5) (167-169). These tools include an online health information portal combined with clinical decision support and referral systems, a direct secure messaging system for communication between HCPs, or solely a clinical decision support system for CP-client consultations.

*Evidence-based practice guidelines for the management of acute pain*

Two studies investigated the data captured from retrospective chart reviews and flow-chart protocols implemented by CPs for adults presenting with dental pain and back pain, respectively (Table 5) (170, 171). As such, CP's acute pain knowledge and management practices were observed and contrasted with clinical guideline recommendations.

#### 4.3.1.2 Patient-targeted practices and interventions in acute pain management

*Patient counselling*

Patient counselling was the most common intervention implemented by CPs for adults presenting with inquiries about their disease state. Four studies evaluated patient counselling as a means for CPs to assist adults in self-managing their acute pain conditions including acute LBP, knee pain (e.g., pain aching, or stiffness around the knee(s)), acute musculoskeletal pain, toothache, and

acute non-malignant pain (Table 5) (148-158, 167, 168, 172-174, 176-179). This intervention primarily focused on delivering information as recommended by clinical practice guidelines and CPs' pharmacotherapy expertise.

*Provision of Self-Care Advice*

Six studies included as part of their intervention the provision of self-care advice to adults with acute pain concerns (Table 5) (163, 169, 172-174, 181). Self-care is characterized as specific activities individuals do for themselves to maintain adequate health and prevent aggravating symptoms and illnesses (181). Unlike patient counselling, the guidance provided by this intervention empowers adults with simple and recommended tools, skills, and strategies to better control their acute pain. As trusted resources, CPs' self-care advice for consumers with a given acute pain condition includes valuable information on self-medication, physical activity (PA), bed rest, ice, superficial heat, and reassurance of a favourable outcome (163, 169, 173, 174).

### 4.3.2 Thematic Framework Analysis

In this section, the interventions identified from the numerical frequency analysis were expanded upon in further detail using a qualitative thematic analysis. We generated codes or relevant themes centred around CP- and patient-targeted interventions, barriers, and facilitators-solutions in acute pain management from the quotes obtained from the selected studies to support our data interpretation and provide examples.

#### 4.3.2.1 CP-targeted thematic framework analysis

##### *i) CP-targeted practices or interventions to improve acute pain management*

CP-targeted practices or interventions in acute pain management were defined as interventions and procedures implemented by the healthcare system for CPs. This theme was supported by

subthemes such as the development and implementation of educational interventions, electronic clinical tools, and changes to current evidence-based guidelines in acute pain care.

*Subtheme 1: Educational Interventions*

Educational training sessions or workshops following a knowledge-based and theoretical approach (e.g., performed online electronically) were mostly characterized with the purpose of expanding CP's current knowledge base regarding acute pain management strategies. They were either delivered as interactive in-person training sessions or remotely delivered workshops (webinars) providing CPs with similar information on tools, strategies, etc. (148, 149, 156-160, 162, 166, 168).

> "2-h educational workshop on the evidence-based management of LBP. This workshop covers the LBP care pathway, simple screening strategies, and guidelines on when to refer patients for treatment. This also encouraged a discussion with patients about medication and condition history and prompt a referral where necessary."
>
> (Original author)
>
> (Abdel Shaheed et al. 2015)

These workshops were documented to be relevant and useful to everyday practice. The methods of delivery of this intervention were flexible (e.g., online) and free of charge (160). Basic topics covered include appropriate pharmacological (e.g., opioids, non-opioids, topical and oral analgesics) and non-pharmacological management with follow-up and medication reviews. Workshops also described clinical and practical information on acute pain conditions, screening strategies to distinguish signs and symptoms (i.e., red flags) of more complex acute pain conditions, guidance on self-medication strategies, key pamphlet messages to reinforce CPs

advice, reassurance through motivation and encouragement of PA and changes to adult's lifestyle that can aggravate their condition (s) (159). The establishment of educational workshops as an intervention for CPs was to improve CPs' knowledge and confidence when guiding adults in their self-management of acute pain and re-assuring their confidence in the provision of care.

During the in-person training sessions, the interactive semi-structured interviews focused on creating a dialogue with CPs using open-ended questions to reinforce the knowledge and reasoning behind the previously self-reported questionnaire responses and gain additional comments. Following interviews, some training programs offered CPs one to two-hour continuing educational training sessions presented in either a group or one-on-one format. The topics covered during these one-on-one or group training sessions include learning the appropriate pain advice (i.e., addressing the frequency of acute pain-related visits and the quality of the advice), OTC advice (e.g., perceived risks and benefits), examples of clinical case studies (i.e., vignettes for case-based learning), screening strategies, effective pain management options and tools, etc. (156-162). Subsequently, there was a follow-up questionnaire distributed to CPs to re-assess the acquired knowledge and effectiveness of the educational intervention. These questionnaires were framed to draw CPs' opinions and carry out an inductive exploration of their attitudes, preferences, and responses regarding acute pain management (148, 151-153, 163, 166). *PainWISE* program was an educational training initiative in which CPs undertook extensive training in acute and chronic pain management with the opportunity to ask personnel questions, identify pain management strategies for adults, and actively discuss potential clinical case scenarios with other CPs (174).

> "An educational training program for CPs where pharmacists delivering minor ailment services (e.g., cough, fever, back pain, etc.) were trained for 7.5 hours by researchers and general practitioners. Training aimed to ensure pharmacists' competency in delivering the

service, clinical areas, consultation skills, red flag and other referral criteria, documentation, and technology systems. The program involved a combination of material, lectures, and interactive sessions."

(Original Author)

(Dineen-griffin et al. 2019)

Simulated patient scenario visits were standardized clinical scenarios conducted by research teams to assess CP's current roles and practices in acute pain care and management. CPs are expected to meet the minimum requirements of care following the clinical scenarios. For instance, for a 32-year-old simulated patient with intermittent LBP, the CPs were expected to rule out other medical conditions, advise paracetamol, and if insufficient, advise NSAIDs or weaker opioids, and to visit the hospital if symptoms persisted (164). The authors reported the overall quality of care provided by CPs and the concordance of CPs' acute pain management practices with key recommendations provided in evidence-based guidelines on pain medicines.

"To assess the quality of care obtained from retail drug outlets located within communities. When combined with feedback, they can also be a useful means of promoting rational utilization of OTC medicines."

(Original Author, CP)

(Abdu-Aguye et al. 2017)

These scenarios covered different components of acute pain management practices such as assessment of the medical condition, appropriateness of management recommendations, utilization of OTC analgesics, pain presentation, CPs' counselling practices, and barriers to the provision of management services for minor ailments (161, 163-166).

CPs most commonly dispensed oral analgesics (i.e., NSAIDs alone or in combination), ibuprofen alone or in combination with paracetamol, a selective COX-2 inhibitor, and diclofenac with meloxicam as treatment options for acute back pain and dental pain (161). These results demonstrated that CPs' recommendations for pain medicines were concordant with evidence-based clinical practice guidelines, unlike CPs' recommendations of self-care advice and referrals. With the results obtained from simulated patient visits, topics for improvement of clinical practice can be targeted through a case-based learning approach with the purpose of expanding CP's knowledge and better management of acute pain.

Other studies included semi-structured interviews with or without hypothetical case scenarios to uncover CPs' feedback regarding specific issues in acute pain care and existing barriers in the provision of management services for acute pain conditions in a community setting (164).

*Subtheme 2: Electronic clinical tools*

In the study by Dineen-Griffin and coll., CPs used integrated technology platforms such as HealthPathways (i.e., an online health information portal for clinical decision support and referrals systems) and HealthLink (i.e., a direct secure messaging system for communication between CPs and GPs) to evaluate the clinical and humanistic impact of a CP-led minor ailment (e.g., back pain, fever, cough, etc.) service intervention. This online standardized intervention informed CPs of one-on-one consultations and step-by-step follow-up plans according to the clinical information received (168).

> "HealthPathways is a protocolized evidence-based clinical care pathways specific to each ailment. The clinical pathways for each ailment were used by CPs to guide consultation with their patients. Each pathway offered had the same structure and included assessment

and management specific to each ailment. (…) HealthLink is a direct secure messaging system allowing for bidirectional communication between the CP and the GP."

(Original author)

(Dineen-griffin et al. 2019)

Each therapeutic "pathway" recommended by the web-based HealthPathways tool provided a definitive course of management and referral for clients based on evidence-based best practices along with local resources and services. Another study evaluated the combined use of HealthPathways and MedsASSIST, a real-time monitoring program, to aid in the self-management of mild-to-moderate pain as a clinical decision support system (CDSS) (167, 169). MedsASSIST was developed as a real-time recording and monitoring system for CPs in the management of OTC combined analgesics containing codeine medications to ensure patient safety when distributing OTC analgesics. The latter tools were distributed to CPs to familiarize themselves and evaluate the usability and usefulness of the clinical information provided on the online PDF-based platform for managing analgesia requests and risks of codeine dependence (167, 169). In the RCT by Wood P. and colleagues, over a third of CPs reported that using these interactive electronic tools improved their knowledge (39.7%), confidence (39.1%), and strategies regarding acute pain management (167). Over half of the CPs found the tools easy to access (54.3%) and navigate (53.7%). The integration of digital tools in community pharmacy care minimizes the need for extensive pharmacist acute pain care training, CP workflow, and procedural constraints impacting assessment and decision-making (166-168).

Downie *et al.* also highlighted that 100% of CPs supported the use of CDSS-assisted pain medicine recommendations, 90% supported the CDSS-assisted self-care recommendations, and

88% endorsed the referral advice given (169). Furthermore, CPs agreed on the positive association between accessibility to online interactive clinical tools and their perceived usefulness.

> "The statements broadly reflected agreement with advice generated by the clinical decision support system Web App. It's prompting you to ask questions (some questions we probably don't always ask, but we need to be asking) (…) All pharmacists agreed that the information provided by the CDSS was applicable to the clinical scenarios presented and could potentially improve client-pharmacist encounters."
>
> (CP)
>
> (Dineen-griffin et al. 2019)

*Subtheme 3: Use of Evidence-based guidelines in acute pain management*

Clinical practice guidelines are essential in promoting evidence-based practices and supporting therapeutic decision-making. Initiatives that expand CPs' roles and responsibilities, based on best evidence in acute pain care include systematic medication review, flow-chart protocols, and disease state management programs for short-term management of pain conditions such as acute LBP and knee pain with repeated, regular follow-ups (149, 162, 170-172, 177).

A study by Vella *et al.* assessed the effectiveness of two standardized flow-chart protocols based on evidence-based clinical practice guidelines for back pain management in community pharmacies (172). The protocols addressed pain intensity, prescriptions, examples of cases detailing the most encountered back pain and presentations, a treatment plan outlining the management of these conditions, and flow charts. CPs tested and compared the practicality and applicability of these standardized flow-chart protocols to usual care. CP's average compliance with the protocols varied from 53 to 57%, demonstrating the need for ongoing support (172).

### *ii) Barriers to optimal management of acute pain in the practices of CPs*

We identified multiple barriers to CPs involvement in acute pain care and negatively influenced the implementation of CP-led acute pain management practices (Figure 2)

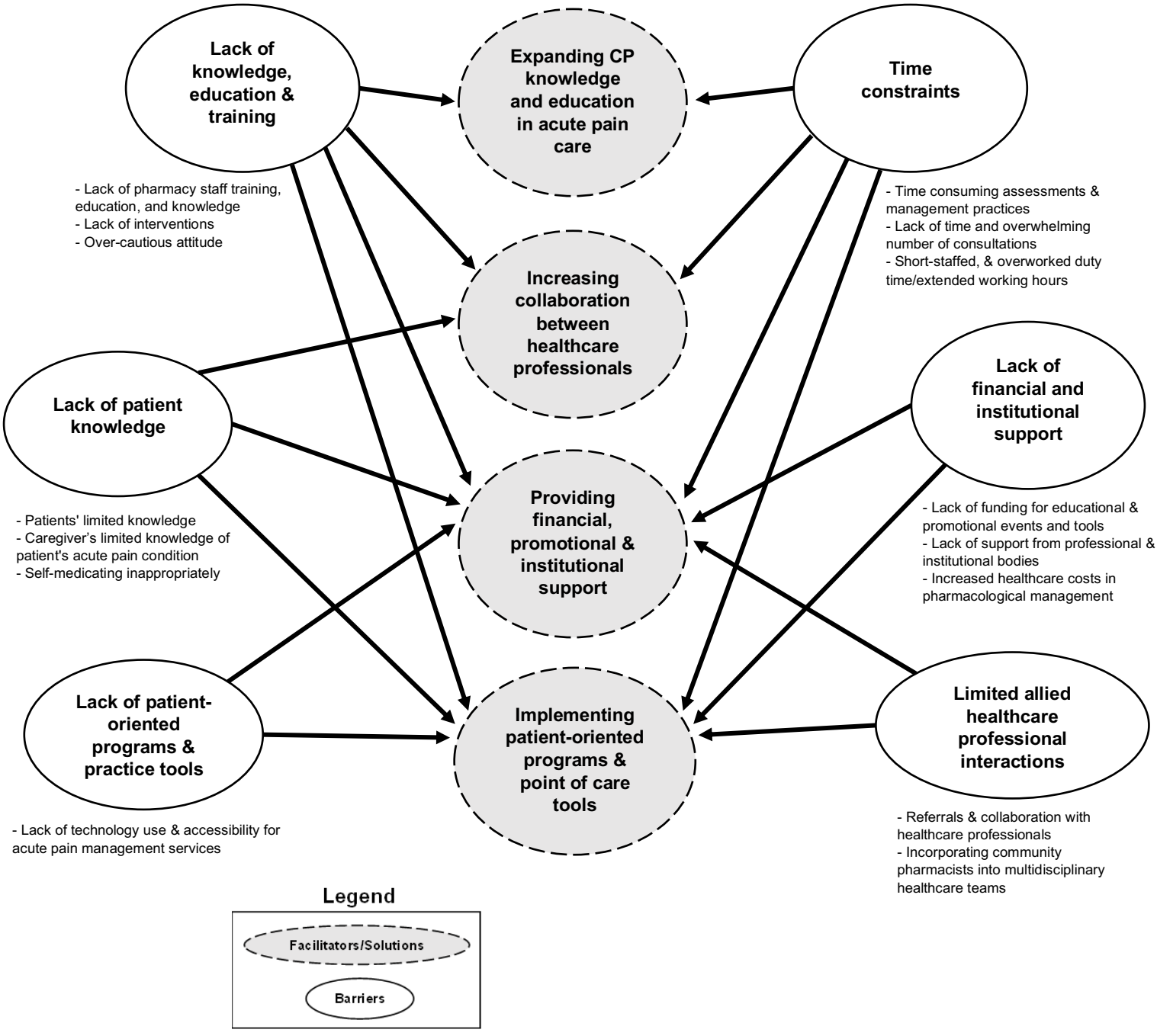


**Figure 2.** Thematic framework analysis of barriers and facilitators-solutions in the practices of community pharmacists for the management of acute pain in adults

*Subtheme 1: Lack of knowledge (education and training)*

CPs have reported the limited education and training available as a commonly observed challenge to providing adequate pain management to adults (148, 153, 155, 159, 160, 164, 182). As a result, CPs expressed difficulties in minor ailments (e.g., acute LBP, musculoskeletal pain states, dental pain, toothache, etc.) practices. (149, 163).

> "Pharmacists also reflected on the current general lack of guidance to manage pain within pharmacy compared with the promotion and availability of management tools for other health conditions."
>
> (Original Author)
>
> (Downie et al. 2020)

Approximately only half of CPs volunteered having had recent pain management training (153). Studies have described adherence to guidelines for both pain and fever as often being suboptimal despite the wide availability of OTC analgesics in pharmacies. Some CPs argued perhaps the lack of knowledge of OTC medicines in acute pain care forced them to make recommendations that were not supported by evidence (153). CPs also wished to be informed on the signs and management of opioid dependence and potential drug interactions with analgesic medicines (167).

Many CPs perceived non-pharmacological therapies and self-care advice as less useful in the management of acute pain; this may warrant education/training on evidence-based information (153). These gaps in knowledge have led to an over-cautious attitude towards pain states (e.g., LBP) which may contribute to suboptimal management of these conditions. CPs' general knowledge of oral health care was also revealed to be poor in specific areas of practice including oral disease prevention, dental health promotion, and reducing oral health disparities, making them less informed on appropriate pain management strategies (155).

*Subtheme 2: Lack of patient knowledge*

Adults' highly variable knowledge and understanding of their pain condition (s) and medications present an important challenge to CPs. With a wide array of non-prescription OTC analgesics and a vague understanding of acute pain conditions, there is room for confusion, doubts, and misinterpretation of the most effective pain management strategies. CPs are generally viewed as dispensers of medicines and less as crucial members of the healthcare team in a position to inform consumers of effective and safe self-care and self-medication practices. This is partly due to the poor community awareness of CPs' role in the management of pain and other chronic conditions (149).

> "Some customers have no awareness regarding generic and brand drugs, and they believe that generic drugs are not effective, especially if the product is from a local pharmaceutical factory."
>
> (CP)
>
> (Achar Ayele et al. 2018)

*Subtheme 3: Lack of patient-oriented programs and point-of-care tools*

The need for patient-oriented programs and point-of-care tools was reported as a persistent barrier to CP's ability to deliver optimal acute pain management interventions. CPs' general knowledge and education in acute pain conditions and management were identified to be poor (155). Patient-oriented programs and practice tools can ensure CPs remain knowledgeable and prepared to implement effective acute pain care to adults presenting at community pharmacies.

> "Need for screening tools which could help them identify red flags associated with acute onset LBP and could easily be referred to in practice."

(CP)

(Abdel Shaheed et al. 2014)

Although current tools in community pharmacy practice exist, many CPs reported the lack of awareness and promotion of clinical practice tools in pharmacies (167). CPs' limited access to and implementation of electronic tools, for instance, was due to CPs having no knowledge of their use in pharmacy practice (167). Tools, however, were considered to have issues regarding their functionality which reduced the effectiveness and timeliness of interactions and CPs' confidence in their ability to implement them. Few CPs were aware of the existence of point-of-care tools stating that access was limited which presented a challenge when integrating these tools into adults' treatment plans (167).

*Subtheme 4: Time constraints*

CPs' time constraints were frequently stipulated as an important barrier. CPs engagement is often limited due to time-consuming consultations, lack of time (e.g., lengthy assessments, family and medication history, and administrative work), busy schedules (e.g., high frequencies of consultations, extended working hours), and lack of resources (staff shortages) (148, 153). In fact, CPs invoked the busy pharmacy schedule among the major challenges for non-compliance with pain protocols (171).

*Subtheme 5: Lack of financial and institutional support*

The lack of strong financial and institutional support in community pharmacy practices limits CPs' ability to offer an extensive array of treatment options and resources (116, 150, 158-160, 164, 174, 179). Furthermore, implementing delivery-assisting clinical tools practice requires funding and resources from professional bodies which is often not available.

> "Lack of support from professional and government bodies to implement clinical tools and programs for low back pain management."
>
> (CP)
>
> (Abdel Shaheed et al. 2015)

Limited training opportunities provided by professional and institutional bodies in acute pain management limit CPs' ability to deliver optimal care to adults. Although existing educational training events can at times be freely accessible, they are often industry-sponsored with content and promotional bias (159, 160).

> "There's not much courses or a lecture on pain management…also, I don't have that much experience [with pain] in terms of the clinic to kind of learn from my experience."
>
> (CP)
>
> (Perrot et al. 2019)

*Subtheme 6: Limited HCPs interactions*

A challenge in CP's engagement in acute pain management practices involves the lack of communication and collaboration with other HCPs (148-150, 159, 178, 182). The limited interactions CPs have with dentists, physicians, physiotherapists, etc. have made it difficult for CPs to direct adults with acute pain conditions toward the appropriate care needed.

For adults with musculoskeletal injuries (e.g., fractures, muscle pain, knee pain, shoulder pain, etc.), CPs have stated the need for more education on the distribution of referrals when they present with "red-flag" symptoms (160, 163). In a simulated patient scenario visit, 57.4% and 22.7% had concerns as to when to refer to a physician and imaging, respectively (163).

> "A comparison of pre- and post-scores showed a large and significant change in pharmacists' responses (…) centred on the need for imaging in acute LBP ("X-rays of the lumbar spine are useful in the workup of patients with acute LBP")."
>
> (CP)
>
> (Abdel Shaheed et al. 2015)

### iii) Facilitators-solutions to improve the management of acute pain in the practices of CPs

Facilitators were defined as solutions that can help overcome barriers or accelerate the implementation of CP practices in acute pain care (Fig. 2).

*Subtheme 1: Expanding CP knowledge and education in acute pain care*

The implementation of CP-targeted educational interventions has been stated as a solution to CPs' lack of knowledge, education, and training in acute pain conditions and management practices. CPs suggested the implementation of online educational workshops with a more theoretical approach to learning acute pain conditions (e.g., LBP), assessment, and management strategies.

> "Majority of the pharmacists strongly agree/agree (89%) that they would benefit from more training/education on acute pain management."
>
> (CP)
>
> (Mishriky et al. 2019)

CPs also prefer case-based learning educational workshops or training sessions with the purpose of providing evidence-based knowledge to inform CPs' clinical decision-making. CPs would be actively engaged through interactive exchanges of ideas and experiences regarding

appropriate acute pain management practices (160). CPs have requested that future educational learning tools cover specific topics on pain care (chronic & acute pain) in various community locations for easy access (159). Some overlooked acute pain care topics include education on the appropriate use of imaging referrals, screening for "red-flag" conditions, non-pharmacological management strategies targeted care programs, greater diagnostic responsibility and prescribing authority, use of oral and topical pain analgesics, patients' perception of weak versus strong analgesics for optimal pain relief, and participation in health promotion tools and campaigns.

> "Majority of the pharmacists strongly agree/agree (89%) that they would benefit from more training/education on pain management"
>
> (CP)
>
> (Mishriky et al. 2019)

> "Pharmacists may require more comprehensive training to enhance their ability and confidence to support consumer co-management of LBP."
>
> (CP)
>
> (Slater et al. 2013)

Finally, educational simulated patient scenario visits were suggested as an intervention to assess the quality of pain care obtained from community pharmacies and their staff members. When used in combination with feedback, they have been demonstrated to be useful means of improving CP's knowledge and skillsets promoting the management of minor ailments including acute LBP in a community setting (161). Thus, ensuring CP's ability to deliver acute pain services falls within evidence-based clinical guidelines.

> "Vignettes are reported to be a valid way to collect information about the quality of clinical practice when compared with standardized patients (the gold standard method)."
>
> (Original author)
>
> (Silcock et al. 2007)

*Subtheme 2: Increasing collaboration between HCPs*

Studies have recommended improving CP's partnerships with other HCPs as a solution to improve the lack of knowledge, time constraints, and lack of patients' knowledge (148). CPs suggested holding regular interdisciplinary team meetings to enable liaison with other primary care team members to address and meet the needs of the local clientele for various pain conditions (116, 182). Team meetings will improve the delivery of pain care advice and services within the community circle of care.

CPs noted the need to increase current pharmacist contacts with other HCPs such that it would improve the rate of referrals and quality of advice provided for adults with complex acute pain conditions (116). Improved pain experiences and patient satisfaction with their pain medications were identified in osteoarthritic adults receiving non-specific knee pain management from partnered CPs, physiotherapists, and GPs (177). In dental practice, following an observational retrospective study, the partial or full integration of CPs with dentists' teams reduced the prescription of opioid analgesics for post-extraction dental pain from 1.8% to 0.5% (170). When CPs were fully integrated into the decision-making stage of prescribing, dentists were 81% less likely to prescribe opioids to adults.

*Subtheme 3: Providing financial, institutional, and promotional support*

CPs believe that the provision of necessary financial, promotional, and institutional support from professional and government bodies to support their practices would enhance their provision of

care. Most CPs refer to financial, institutional, and promotional support to promote their current role and responsibilities in acute pain management. Potential policy changes permitting this must align with funding opportunities. CPs have suggested a policy change towards additional funding for continuing professional development (116, 182). On another note, institutional support was defined as the need for an increase in the number of cost-efficient training courses, workers in a community pharmacy, adequate remuneration for pharmacy staff, and pharmacy training regarding acute pain care (116, 174).

Some CPs sought to address the need for promotional support, that is health promotion strategies and greater advertising to improve community awareness of CP's role in the management of minor ailments (e.g., acute back pain) (148). Health promotion tools include inexpensive easy-to-read written material (e.g., leaflets, pamphlets, booklets, brochures, etc.), health promotion public campaigns and posters, etc. (116, 148, 165, 182). They aim to enhance the customer's understanding of their ailment and the recommended and safe pharmacological and non-pharmacological strategies (165).

> "Information disseminated through leaflets/pamphlets/posters was the preferred choice of many pharmacists for improving their knowledge regarding oral health (funding for more inexpensive options during national oral health campaigns)."
>
> (Original author)
>
> (Priya et al. 2007)

*Subtheme 4: Implementing point-of-care tools*

Patient-oriented programs and point-of-care tools can expand CP's knowledge while contributing to the optimization of pharmacy workflow and CPs time constraints. CPs can also ally themselves with other HCPs within local practices reinforcing HCP partnerships and ensuring safe and

effective transfer of care.

Patient-oriented programs are characterized as comprehensive self-management programs for acute pain incorporating both pharmacological and non-pharmacological approaches (complementary therapies). The Guild program was a professional and nationally recognized pharmacy care program that flags patients with pain conditions who could potentially benefit from a medication review (148). Medication reviews allow CPs to monitor and minimize opioid misuse and abuse while also addressing frequently reported pharmacotherapy-related issues and concerns (152). Similarly, CP-led LBP management services have improved pain management outcomes (e.g., pain control, reduced pain intensity and functional disability) and reduced the health and economic burden associated with LBP (163).

Point-of-care tools can optimize the care CP provides. Screening tools, for instance, were suggested by CPs as an important means to better identify patient pain profiles, distinguish serious "red-flag" conditions (i.e., associated with acute LBP), promote responsible self-medication, and easily refer individuals to in-practice services (148, 163, 179). CPs would also develop multichannel-available tools including leaflets, booklets, mobile applications, web-based applications, etc.

> "Pharmacists agreed that they would benefit from stepwise and easy-to-understand diagnostic tools for identifying red flags."
>
> (Original author)
>
> (Abdel Shaheed et al. 2014)

Utilizing digital technology (e.g., self-reported pain intensities, medicine logs, screening for "red-flag" symptoms, self-care advice, etc.) ensures a degree of flexibility in delivering care,

especially for adults whose acute pain condition restricts physical access to local health facilities (159, 160). As part of a patient-oriented program, the CDSS was used as an electronic delivery-assisting tool for CPs to help with their knowledge of screening for pathology and provide suggestions around the guideline-based care options to select from (167, 169).

#### 4.3.2.2 Patient-targeted thematic framework analysis

***i) CP practices and interventions for patients with acute pain***

*Subtheme 1: Disease management programs or services*

In the studies we have identified, CPs have proposed minor ailment or disease state management (DSM) services targeted at the most commonly observed minor ailments including LBP, knee pain, stiffness of the neck pain, etc. (149, 168, 176) The impact of these enhanced services are often compared with usual care in community pharmacy practice. These interventions aim to optimize medication management, and pharmacological pain control, and reinforce self-help messages.

A DSM program designed for acute LBP was comprised of standardized and structured face-to-face consultations with initial screening and assessment of an adult's acute LBP performed by a trained CP (149). Once CPs have gathered the clinical information, they recommended prescribed or OTC analgesics, information on the harms and benefits of therapy along with self-care advice emphasizing the importance of staying active, avoiding prolonged periods of bed rest, and reassurance. Repeated and regular follow-ups were monitored by CPs over three months to ensure that adults were compliant and satisfied with their pain control and performed modifications as necessary. Any suspected "red-flag" symptoms necessitated CPs to refer the adult to the appropriate HCP. Each consultation was documented into the HealthLink integrated technology platform for direct secure messaging with GPs regarding the consultation outcomes (149, 168).

Adults in these DSM programs were 1.2 times more likely to receive appropriate non-prescription medicine recommendations and 1.5 times more likely to receive an appropriate referral for severe or disabling pain by their CP than adults receiving usual care. (168).

A similar pragmatic RCT investigated an enhanced pharmacy review service paired with advice leaflets as part of a DSM program to optimize drug management and pain control and provide self-help recommendations in older adults with knee pain towards systematic, effective care (176). The main outcome measured was the changes in the Western Ontario and McMaster Universities osteoarthritis index (WOMAC) pain and function scores. At three months, there were significant improvements in the WOMAC pain and function scores in the enhanced pharmacy review group of adults compared to the usual care control group. Furthermore, CPs' involvement in adults' pain care has significantly lowered self-reported use of NSAIDs (e.g., self-medication) by 16% at six months compared to control groups and directed adults to consume simple analgesics which are less potent and safer than opioids by 70% (176).

*Subtheme 2: Educational interventions*

One-on-one patient consultations are the most common CP-led intervention for adults. Patient counselling includes pharmacy medication or enhanced pharmacy reviews, minor ailment service intervention, OTC analgesics management, patient education, self-care advice, route of administration, screening assessment, referrals, etc. (167)

CP-delivered structured medication reviews, also known as enhanced pharmacy reviews, have also been utilized as an effective practice in patient consultations. The reviews explore the use of prescribed and OTC pain medicines along with the perceived effectiveness in pain control. In over 90% of adults with knee pain, significant improvements were seen pain scores relative to the control intervention groups (178). During the consultations, eight out of ten patients changed

their pain treatment, where some were recommended to discontinue their prescribed NSAIDs by their CPs while others were recommended to change to intermittent use (178).

CPs also delivered short patient educational sessions as part of multi-structured treatment programs. CP-led educational sessions provided patients with knowledge on the quality and safe use of pain medicines, alternative OTC analgesics with less likelihood of causing adverse effects, non-pharmacological pain management strategies (e.g., heat application, physiotherapy-guided exercises, etc.), reassurance of favourable pain outcomes, self-help messages, and "red-flag" symptoms (158, 173-175). Indeed, patient educational sessions seemed to be effective as an integral part of acute pain care pathways in pharmacy practice.

Health promotion activities can enhance community knowledge of acute pain condition (s), acute pain management strategies, and awareness of the role of CPs in acute pain care (165, 180, 182). Improved community and HCP knowledge were noted for dental and back pain conditions following the use of health promotion tools. In a simulated patient study, CPs provided the simulated patient with a booklet on back pain to help them understand the anatomy of the back, the importance of proper posture and recommended exercises to strengthen the back (165). CPs suggested that self-help strategies for adults to perform should be reinforced in leaflets particularly around information and reassurance (remain positive) about their acute pain condition, lifestyle changes, appropriate exercise options, and the importance of prioritizing daily activities to balance activity and rest (178, 180). Thus, adults gain the information, motivation, confidence, and skills to manage their acute pain and prevent a decline in their health.

Finally, we noted a lack of studies on the use of electronic tools to assist adults presenting with acute pain condition (s). In one study by Perrot and coll., the applicability of multimedia

education about analgesics as an adjunct to usual care improved patient knowledge, attitude, satisfaction, and skill acquisition towards their acute pain condition (179).

*Subtheme 3: Referrals*

When a painful condition worsens or the patient exhibits "red-flag" symptoms, CPs can provide referrals to the appropriate HCP to meet their pain management needs (e.g., dentist, ED specialist, physiotherapist, imaging, etc.) (116, 163, 167, 168, 180, 181).

Studies have shown that CPs are confident in their ability to refer adults to a dentist when presenting with painful oral health issues if needed. Pharmacists advise their clients to visit a dentist in 94.1% of cases regarding dental pain and any underlying cause compared to seeing their GP in 23.5% of cases (116). Most CPs suggest that their clients consult a nearby dentist after dispensing painkiller medications or OTC analgesics for short-term pain relief (182). CPs recommended improving their partnership with dental providers with referrals to potentially reduce unnecessary opioid utilization and optimize pharmacy and dental practice workflow (170).

> "When pharmacists advised patients complaining about dental pain, it would be to consult a dentist (…) one hundred and sixteen (81.7%) pharmacists refer patients requiring dental care to dental professionals."
>
> (Original author)
>
> (Omar A Bawazir et al. 2014)

When adults present themselves at community pharmacies with suspected signs of acute LBP, musculoskeletal injuries, or fractures, they are often referred to an ED specialist for imaging. However, Dabbous and coll., noted that CPs were less confident in advising clients regarding back pain conditions especially around the topic of referrals to the appropriate HCP (115).

*Subtheme 4: Recommendation of analgesics for pain management*

CPs pharmacological recommendations for adults with acute pain conditions can range from simple opioid analgesics, non-opioid analgesics, and topical analgesics, to combination therapy for an effective treatment regimen (163).

Opioid analgesics are recommended by CPs to adults with moderate to severe acute pain. The most frequently prescribed opioid for acute pain includes hydromorphone, morphine, and codeine combined with acetaminophen (148, 172-174). CPs have stated that products containing only codeine, oxycodone, or hydrocodone are not recommended as a first-line treatment for acute LBP since they are subtherapeutic weak opioid analgesics and provided inadequate pain relief for mild-to-moderate acute pain if given alone (170, 174).

The most recommended non-opioid analgesic by CPs for acute pain relief is paracetamol with a maximum therapeutic dose of 4g daily in divided doses. Often, the first-line drug choice for the treatment of acute non-specific LBP (148, 159). For moderate acute pain conditions, NSAIDs are also recommended especially diclofenac and/or ibuprofen for pain relief. Diclofenac (50mg) was the most preferred analgesic in pharmacies (59.8%) compared to ibuprofen in 40% of pharmacies (115, 161). For adults presenting with toothache, ibuprofen was ranked as the first choice by 73.6% of pharmacists in contrast to aspirin which was ranked fifth (36.8%).

> "Current guidelines recommend regular use of paracetamol (4/g daily in divided doses), although the benefits of this regimen are largely unclear. The majority (> 66 %) indicated they usually recommend paracetamol."
>
> (CP)
>
> (Abdel Shaheed et al. 2014)

Topical analgesics are commonly dispensed as a first-line non-prescription treatment, with or without an oral analgesic, for acute pain with low levels of pain intensity (168, 171, 174). They are applied to body surfaces to treat painful ailments and are more frequently counselled than oral treatments (157, 173). CPs have recommended topical analgesics to 33.1% of adults with a low degree of disability acute LBP (157). Considering their efficacy and safety balance, CP believed that topical analgesics could be used more frequently for acute LBP events with low-to-moderate acute pain intensity as a stand-alone or combination treatment.

Combination therapy is characterized as a personalized treatment regimen with a set of complex pain medicines containing opioid analgesics (163, 178). CPs frequently recommend paracetamol, followed by OTC NSAIDs such as diclofenac and/or ibuprofen (oral), and topical rubefacients among other agents to effectively manage acute pain at low doses and reduce the risk of opioid-related harm (115, 148). In adults with toothache, paracetamol and codeine were CPs preferred main analgesics followed by aspirin, paracetamol, and codeine. (170).

*Subtheme 5: Alternative non-pharmacological therapies and self-care advice*

Common non-pharmacological interventions include advice around bed rest, heat and cold application, physical activity, stress management and reassurance (115, 148, 152, 162-165, 169, 172-174, 178, 181).

For adults with acute LBP, most CPs emphasized the importance of avoiding prolonged bed rest and applying heat or cold (173). Most CPs (93.3%) agreed on advising clients with acute LBP to avoid performing any aggravating tasks (e.g., lifting heavy objects), concordant with guideline-endorsed recommendations (115, 148). In addition, CPs remind adults about safe behaviours when self-medicating (e.g., dosing, frequency, time to consumption) with prescription and non-prescription analgesics to promote safe HCP-guided self-medication strategies.

### *ii) Barriers to patient engagement in the management of acute pain*

The following barriers were reported by CPs and adults visiting community pharmacies as challenges that hinder adults' self-management of acute pain (Figure 3).

*Subtheme 1: Limited adult knowledge*

Adults' limited knowledge about their acute pain conditions and appropriate management practices can compromise the care they receive. CPs reported a significant lack in adults' general beliefs about acute pain, risks of disability and confusion around the use of non-prescription pain medicines (162, 163, 180). Adults are reluctant to take certain OTC analgesics such as paracetamol because they seek what they perceive to be stronger pain relief for their acute pain (e.g., back pain) through a combination of analgesic medicines or NSAIDs without any knowledge of the risks and benefits of the analgesics. There is also confusion regarding generic and branded products.

> "Some customers have no awareness regarding generic and brand drugs, and they believe that generic drugs are not effective, especially if the product is from a local pharmaceutical factory."
>
> (CP)
>
> (Achar Ayele et al. 2018)

Adults frequently present themselves at pharmacies to self-medicate for mild-to-moderate pain (179). CPs conveyed the importance for clients to engage in discussions about their medications (148). This practice will reduce the risk of adverse events due to incorrect self-diagnosis, minimal inappropriate dosing, cost-effective selection of analgesics, delays in seeking medical advice, and risk of analgesic misuse (164, 179). CP guidance ensures that adults are aware of effective and safe OTC analgesics as an interim measure for their acute pain coupled with the

necessary referral treatment early on. (156, 179). In cases when a caregiver presents the adults' acute pain symptoms or condition (s) to CPs, it is possible that information may be omitted or incorrectly relayed by the caregiver, which may affect the appropriateness of the plan recommended to the patient.

> "Given patients' confusion about non-prescription pain medications, physicians and pharmacists should alert patients to maximum daily analgesic doses and the potential for over-medicating with multiple products."
>
> (CP)
>
> (Hunt et al. 2007)

*Subtheme 2: Time constraints*

Adults reporting short-term acute pain often expect instant relief following their visit with the CPs (148). Time pressure on CPs can lead to less rigorous approaches to acute pain management; busy pharmacy schedules, time-consuming paperwork (e.g., informed consent, pain assessment forms), and complex patients' medical situations were noted to have an impact on care (148, 171).

> "Pharmacists presume that consumers expect to make over-the-counter purchases without being questioned and feel less obligation to give advice to patients who do not demand it."
>
> (CPs)
>
> (Vella et al. 2009)

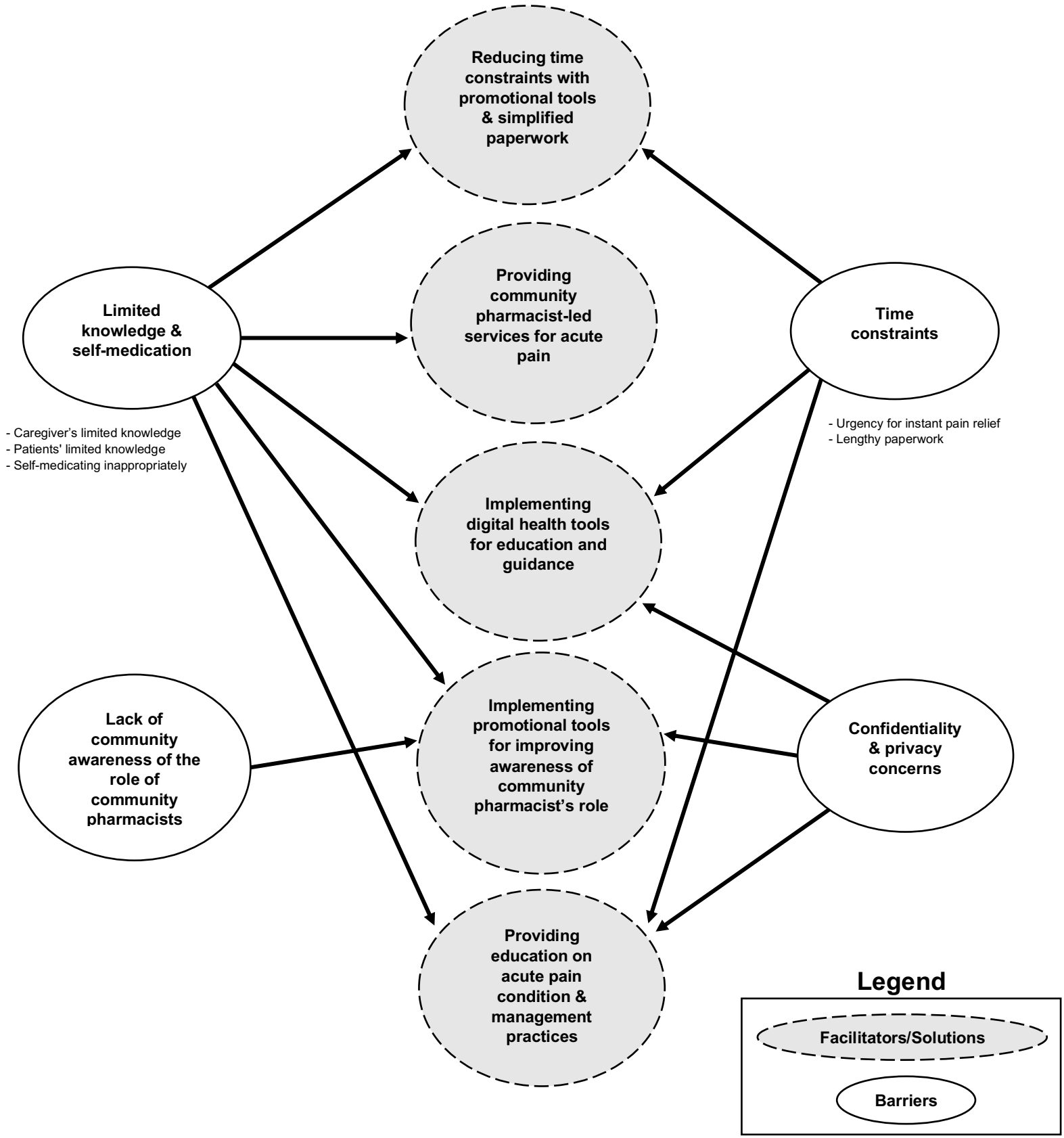


**Figure 3.** Thematic framework analysis of barriers and facilitators-solutions for patient engagement in the management of acute pain with community pharmacist

*Subtheme 3: Lack of community awareness of the role of CPs in acute pain care*

There is general unawareness from consumers' perspectives of what CPs can provide beyond the dispensing of OTC or prescription pain medicines (150, 163, 164, 174). As such, CP's ability to provide comprehensive counselling and education and other services becomes untapped. Such low awareness also compromises the ability of CPs to provide clinical tools that can empower adults in the self-management of their pain.

*Subtheme 4: Confidentiality and privacy concerns*

Patients prefer HCPs to listen to their pain management needs in private without generalization and judgment. However, in local pharmacies, adults often consult CPs in common areas of the pharmacy, thus jeopardizing their privacy (174). This barrier may contribute to patients' resentment of questioning, and possibly their non-compliance to CP-led interventions (171).

### *iii) Facilitators-solutions for patient engagement in the management of acute pain with CPs*

Facilitators are potential solutions to mitigate the impact of the previously named barriers in patient engagement in the management of pain reported in the studies we have reviewed.

*Subtheme 1: Time constraint-reducing strategies*

Time constraint-reducing strategies mentioned included simplifying paperwork, providing informational tools coupled with advice for patients with "red flags" symptoms to seek medical advice from a specialist, and triaging acute pain-related clinical symptomology (148, 173).

The simplification of acute pain-related (e.g., LBP, dental pain) tools could be streamlined, single-paged, and easy-to-read handouts/forms (173). Simple information materials (leaflets, brochures, pamphlets) should roughly explain to adults what is involved and what to expect with

their acute pain condition and treatment options (165). Specific topics that should be covered include self-medication strategies, benefits and risks of self-medication and OTC analgesics (179). Greater advertising of CP's responsibilities in acute pain care and management through window displays, posters, and public health campaigns was reported as a strategy to promote patient engagement (148, 158, 180)

CPs suggested developing multichannel tools such as written health information materials with mobile or web applications for better accessibility to care, self-management of acute pain, and reduction in time-restricting constraints (179).

*Subtheme 2: CP-led services or interventions for acute pain*

CP-led interventions have improved acute pain management outcomes and minimized the risks of opioid misuse (176, 177). Most CPs have indicated that with adequate training, staffing, electronic tools, and monetary reimbursement, they would have enough resources to deliver successful acute pain management services (e.g., LBP) with sufficient flexibility to meet individual pain management needs. Follow-ups are beneficial since they reinforce CPs' involvement in patients' progress which will, consequently, motivate members of the community to approach and rely on CPs to treat their acute pain concerns and increase their uptake (157, 163, 170). When adults return with persisting "red-flag" symptoms, these services can offer urgent referrals to appropriate resources that can alleviate their aggravating acute pain condition (s) (155).

> "Implementation of an LBP management service would have a direct benefit to the patient (improved pain management) and broader benefits to society (reducing health and economic burden associated with low back pain)."
>
> (CP)
>
> (Abdel Shaheed et al. 2016)

*Subtheme 3: Digital health tools for education and guidance*

In community pharmacy practice, electronic tools such as the Internet and mobile applications can provide flexibility in implementing acute pain management interventions and empowering clients in their self-care. Digital health tools can provide rapid access to effective pain care especially when there is limited access to an HCP. The data systems connecting the digital health tools can facilitate the management of the adults' health information, reduce costs, improve pharmacy workflow, and enhance the sharing of information with other HCPs (179). With a secure way of collecting and storing information, CPs can perform the required prevention, screening, medication dosing, and clinical management of acute diagnosis in an organized manner. (167).

*Subtheme 4: Health promotion to increase community awareness of CP's role*

Health promotion tools and services are integral in improving the health status of the general population. Promoting CP-led interventions and raising community awareness of the CP's role and responsibilities in acute pain care can improve the acceptance of CP-led interventions. In Australia, a mass media public health campaign has successfully improved the community's attitudes and beliefs around back pain (e.g., PA-related and work avoidance beliefs) and reduced clients' functional disability and the economic burden of back pain within the community (158, 180).

*Subtheme 5: General public awareness of the importance of acute pain management*

Appropriately educating adults in acute pain management will improve self-management (176). Because of their expertise, CPs can guide adults toward the most effective and safest therapeutic modalities (e.g., non-pharmacological strategies, and OTC analgesics). CPs have stressed the need for public education regarding both "what to do" and "what not to do" when suffering from acute pain. (156, 179).

Their widespread presence in any geographical area and frequent contact with the public

potentially provide CPs with the ability to play a supporting role in public patient education, such as the possibility of establishing educational support interviews, monitoring the progress of implemented interventions, delivering health information tools (e.g., leaflets, booklets), and implementing online or mobile applications as potential sources of information and education regarding pain self-medication and their ailment (116, 165, 179, 180, 182).

# Chapter 5: Discussion

## 5.1 Summary of Evidence

Although the number of studies identified was substantial, evidence on CPs practices and interventions in acute pain condition (s) remains limited with most research conducted in the past 10 years focusing on acute non-specific LBP, dental pain, and musculoskeletal injuries. Australia and the United Kingdom have studied this field more effectively and there were relatively few clinical trials evaluating CP interventions in the field of acute pain management. Current evidence in the literature suggests that the role of a CP in acute pain management is mostly documented as a medication resource providing limited pain medication information and education for safe and effective patient care, facilitating drug delivery during critical situations, and preventing medication errors. We also noted a paucity of studies describing or evaluating digital health interventions in this area of care.

We categorized interventions as targeting CPs or targeting patients who present with an acute pain condition (s); not surprisingly, most of these interventions aimed to improve knowledge around the condition responsible for the acute pain and support evidence-based practices. Professional educational programs (workshops, training sessions) and simulated patient scenario visits were the most frequently reported CP-targeted interventions (148, 156-166). We also noted that some educational workshops or training sessions were provided by physicians and nurses (161).

Proper ongoing education and training on diagnosing acute pain conditions, identifying proper care pathways, as well as triaging and counselling clients with pain on “red-flag” symptoms can positively impact clinical practice (116, 161). Educational workshops, simulated patient visits and practice evaluation favourably influenced CPs’ knowledge, attitudes, and beliefs toward acute

pain conditions (116, 148-150, 155, 159, 160, 163, 165, 182). These results are consistent with the findings from the continuing education program and health campaign initiatives conducted in Australia and the UK that have successfully improved CP's attitudes, practice and awareness of current evidence-based guidelines for pain conditions (acute or chronic) (189-192)

Modifying the undergraduate pharmacy curriculum to provide opportunities for pharmacy students to develop their knowledge and skillsets along with the ability to interact with other health professionals was noted as a way to change practices in the future (155, 165, 182). This finding corroborates recent literature showing that many schools of pharmacy in North America are actively engaged in the advancement and restructuring of their curriculum in response to having pharmacists assume an advanced practitioner role (193, 194). Interprofessional team education, intended to enhance shared care in clinical practice settings, is valued and is now part of the early curriculum in healthcare professional training, including that of pharmacists. (195). Indeed, pharmacist-led academic training courses with dentists proved to be effective in expanding CPs' oral healthcare knowledge and led to a reduction in opioid prescriptions by dentists. CPs were confident and able to provide personalized treatment-related information such as alternatives to opioids in self-managing dental pain (155, 170). Examples of effective collaborative practices with CPs exist in many acute and chronic conditions such as COVID-19 disease, HIV management, heart failure, and diabetes in under-served areas (196-200).

Our analyses demonstrated the lack of point-of-care tools in supporting CPs' assessment of acute pain symptoms and decision-making recommendations especially in managing frequent cases of LBP (159, 160). With practice tools, CPs can more effectively identify potential inadequacies in the treatment option (s) and offer safer pain management strategies or referrals to a specialist (174). An estimated seventy-one percent of CPs in local pharmacies in England

supported the idea of an online clinical decision-making tool called Pathways File which presented clinical- and evidence-based flow diagrams for different acute pain conditions (e.g., toothache, mouth ulcers, sore mouth, bleeding gums, LBP, etc.) for CPs to identify the appropriate treatment and self-management options available or relevant emergency referrals (116, 155). Overall, greater accessibility to acute pain-related point-of-care tools for pharmacy staff with frequent regulatory control is needed. The availability of clinical electronic tools in community pharmacy practice was also found to be scarce. Current evidence involving FDA-approved digital health therapeutics in pharmacy practice is mostly for chronic conditions including diabetes, asthma, chronic LBP, chronic opioid use disorder, etc. (187, 188) These interventions available in practice could be adapted and implemented in strategies for acute pain assessment and management (167-171). Electronic tools based on clinical practice guidelines can support CP's decision-making around appropriate acute pain management options and empower patients with the necessary skills and resources to self-manage their acute pain.

Patient counselling represents the most commonly patient-targeted intervention. Adults have benefited significantly from this convenient intervention resulting in improved short-term pain intensity and minimizing the risk of adverse events from OTC analgesics, opioid-related harm, and unnecessary analgesic consumption (176). Over the past decade, access to OTC analgesics for acute pain has increased (182-184). In the US, 35%-40% of people use non-prescription medications on a regular basis (185). This increased accessibility to OTC analgesics allows for self-diagnosis and self-medication, consequently giving rise to risks of misuse of non-prescription drugs and harms. (186). Protocol-based counselling practices offer CPs the ability to perform medication reviews extending their prescribing skills in the provision and alterations of opioid and non-opioid analgesic prescriptions and, thereby, reducing unnecessary prescription

(‘’deprescribing’’), costs, and work for other members of the healthcare team (170, 178). An educational intervention to encourage the de-prescribing of NSAIDs in older adults resulted in a 37% improvement in de-prescribing these medications when clinically appropriate (201).

Barriers to CPs engagement in adults’ acute pain management included lack of CP education and training (knowledge), lack of patient knowledge, patient self-medication, lack of point-of-care tools, time constraints, lack of financial and institutional support, and limited allied HCP interactions. In response to these challenges in community pharmacy practice, the interpretation of our results emphasized the need for an expansion of CPs’ and adults’ knowledge in acute pain care and increased collaboration between CPs and other HCPs as solutions. The integration of digital health technology in pharmacy practice was also identified as a proposed solution as it can increase knowledge and self-efficacy both in patients and their families (202).

### 5.2 Research Gaps & Ways Forward

Evidence supporting pharmacists’ knowledge and preparedness toward acute pain management remains limited and variable. We identified four major research gaps in the field of acute pain management interventions in community pharmacy practice which centred around these four questions: (i) How do we tackle the lack of patient knowledge on acute pain conditions and management practices?, (ii) What are the optimal educational programs to improve CP and patient knowledge on acute pain management and how do we implement them?, (iii) How do we increase community awareness of the importance of the CPs role in acute pain care (services, health promotion, management strategies)?, (iv) How do we implement CP-led interventions that can improve acute pain management outcomes in community settings, and (v) How do we promote and implement the use of digital tools (e.g., mobile apps, multimedia programs, web-based interventions, etc.) in CP practices for acute pain management?

Adults' minimal knowledge of their acute pain condition (s) and the appropriate management practices were reported to limit the care provided by CPs. Often, an adults' insufficient understanding of their acute pain and proper self-medication practices (use of NSAIDs) may result in the risk of inappropriate dosage, adverse drug reactions, drug interactions, prolonged, or frequent use of drugs, and life-threatening harm (203). However, with adequate patient education and awareness, self-medication strategies may lead to a positive outlook by ensuring adequate patient participation in care making them more self-sufficient, and self-empowered, and decreasing unnecessary healthcare service expenses. Patient education has been advocated as an effective means to not only help understand the construct of patients' acute pain but also avoid emotional distress that may worsen their acute pain and possibly lead to the chronification of pain (204). Two systematic reviews have stated that primary care–based patient education can reinforce positive pain outcomes in patients with acute LBP (205, 206). Patient education can thus inform appropriate acute pain management strategies, the value of patient adherence for adequate acute pain control and the potential risks of higher incidence of chronic pain syndromes.

The great majority of studies identified (65%) focused on CP's current knowledge, views, experiences, and involvement in the management practices of acute pain conditions. Findings informed the limited attention and knowledge directed towards CP-led interventions for acute pain conditions frequently observed in community settings including musculoskeletal pain (e.g., knee pain, shoulder pain, muscle pain, non-specific LBP) (146, 162). Unlike the management of chronic pain conditions, CPs reported gaps in the provision of adequate acute pain information and counselling practices (155, 160, 165, 168). We believe that CP's clinical training in managing different acute pain conditions can be taught by other qualified HCPs (e.g., GPs, dentists,

physiotherapists, specialists, etc.) to reinforce CPs' confidence in the provision of optimal acute pain care and strengthen interrelationships between health professionals. Given that professional educational programs and simulated patient scenario visits are effective in assessing and expanding CPs' knowledge of acute pain management practices, we propose that implementation studies (prospective clinical trials) that measure the effectiveness of CPs acquired acute pain-related knowledge by evaluating their impact on patient outcomes be considered. Following CPs clinical training, patients taking part in this clinical trial would present themselves at targeted community pharmacies with acute pain concerns to receive CP-delivered patient education on their acute pain condition, acute pain management recommendations, self-medication strategies (e.g., appropriateness of recommended OTC analgesics, potential adverse effects, dosing instructions), key self-care messages, etc. At follow-up visits, a cross-sectional survey could then be provided to assess patient outcomes including patient knowledge of acute pain condition (s) and management practices, pain intensity (pain scale and pain score), time to pain control (the time until the reported pain reaches a score of 4 or less), quality of life (functional measures, emotional distress, interference with daily activities), and opioid & non-narcotic agent use (the difference in the number of opioid tablets prescribed versus the self-reported number of tablets taken). In turn, the results obtained from this prospective study may provide information that could help guide decision-makers such as CPs in their identification and selection of appropriate acute pain management interventions that will translate into the success of professional educational programs and community-engaged care.

The lack of tools and interventions to inform members of the community regarding CP's role in acute pain care is a major knowledge gap that deserves further attention. Our results indicate that CPs sought to address the need for promotional support, that is health promotion strategies

and greater advertising to improve community awareness of CP's role in the management of minor ailments (e.g., acute back pain, dental pain) (145, 157, 179, 181). In Australia and the UK, national public health campaigns promoted through window displays, posters, leaflets, booklets, and promotional television advertisements have shared information relevant to current pain-related health issues and CPs' involvement in acute and chronic pain care (156, 181). In fact, in Australia, a large public health campaign was successful in improving older adults' attitudes toward LBP, reducing functional disability related to LBP, and reducing the economic impact of LBP care within the community (179). By advertising these campaigns, CPs have the ability to sensitize the community about the risks and benefits of acute pain management practices and influence adults' choices in appropriate care pathways (e.g., analgesics) (171). Taken together, current health promotion tools and strategies may be used to guide future research on identifying various means to increase community awareness of CP's role in acute pain care. The latter interventions may encourage pharmacy consumers to approach CPs with their pain management needs ensuring that they engage in healthy behaviours consequently reinforcing positive patient-centred outcomes and community beliefs around acute pain conditions and community pharmacy care.

The literature is sparse in describing the best implementation strategies for the limited CP-led intervention programs available (112, 210). A systematic review indicated the need to employ pilot studies assessing the effectiveness of clinical guideline implementation in community pharmacy practice (211). Currently, CDSSs show the most promise among current implementation strategies in this setting. With the purpose of guiding HCPs' decision-making, CDSSs generate guideline-concordant recommendations specific to patient characteristics found in electronic medical records. They can also provide alerts of critical values, reminders of preventive health tasks, advice for drug prescribing, and suggestions on various care pathways (212). With the

anticipated growth of the aging population and the subsequent increase in the number of adults suffering from acute pain, more effective means of safely prescribing and optimizing opioid and non-opioid analgesics with patient education on appropriate self-management practices are required. As such, CPs are the most suitable healthcare experts to bridge an important gap during transitions of care for discharge in acute pain management patients. Future pilot studies could expand CP's responsibilities by implementing intervention programs with a collaborative practice model and the required professional training programs adapted to the area of acute pain care. An intervention of this type could include a CP-led opioid exit plan that would allow for CPs to perform medication reconciliation following transitions of care on discharge. CPs would thus oversee the proper initiation and discontinuation of opioid analgesics, incorporate opioid misuse risk screenings, evaluate alternative non-pharmacological therapies, and identify follow-up strategies (213, 214). Subsequent clinical trials can also reinforce the clinical effectiveness of CP-delivered interventions including the CP-led opioid exit plan through the application of computerized tools such as CDSSs designed to support and improve CPs' clinical decision-making.

Finally, the literature describing CP-delivered acute pain management interventions has very little focus on the implementation of digital health technology in pharmacy practice. Out of the 34 eligible studies, our scoping review identified only three studies addressing digital health technology in line with CP's decision-making for identifying appropriate acute pain-targeted care plans and recommendations as well as CP’s intercommunication (shared decision-making) with other healthcare experts. Community pharmacy-related digital health tools can branch out in the form of mobile apps, multimedia programs, web-based interventions, etc. encompassing medication adherence, monitoring the progress in acute pain disease states, and overall health and wellness. While there is growing evidence suggesting the usefulness and feasibility of mobile apps

and telehealth platforms in the treatment of chronic conditions (hypertension, diabetes), our review suggests that there is scope to extend community-based participatory research examining the contribution of CP-delivered digital health technology in CP-patient partnerships. CPs may be useful in promoting online interactive self-management tools (e.g., mobile apps, web apps) that will inform the necessary acute pain information and educational resources to help patients self-manage their acute pain. A promising high-fidelity prototype mHealth application, for instance, was recently created to empower older adults to self-manage their post-fracture acute pain (107). This mobile app primarily focuses on medication management and adherence with support for other pain management needs such as educational materials and external available resources. In future studies, clinical trials can be conducted to evaluate the usefulness of delivering this mHealth application through CPs following patients' discharge and the impact on patient health outcomes. Together, these digital instruments may also capture patient empowerment by increasing patients' self-efficacy skills (e.g., self-reporting acute pain, logging their medications, monitoring progress, access to educational resources), perceived personal control of their care, and reassuring favourable acute pain outcomes (207, 208).

### 5.3 Strengths and limitations

Much time was accorded to the development of a comprehensive search strategy, the research question (five iterations) and the thematic framework analysis with help of experienced colleagues in literature search and qualitative analysis. The criteria we used to identify conditions associated with acute pain represent what CPs face in their clinical practice (dental pain, musculoskeletal injury and post-operative pain). A large number of studies were identified, screened and retained allowing for a rich quantitative and qualitative analysis. However, we cannot draw conclusions regarding the comparative effectiveness of various interventions on pain intensity and relief.

Our study has limitations. Firstly, there was a lack of specificity in the term "pain" frequently used interchangeably for chronic or acute pain. There is no consensus on the definition of acute pain; though most will agree that acute pain is limited in time and of sudden onset (209). This lack of specificity led to many studies being excluded because their focus was on chronic pain management. Secondly, the description of the interventions was at times cursory. Finally, the studies on the use of electronic tools and mobile applications in community pharmacy practice for acute pain care and interventions for people living in rural areas were few.

### 5.4 Conclusion

Our scoping review identified several CP practices for the management of acute pain in adults that focused largely on punctual educational activities (self-education and patient–targeted education); with limited information on the use of digital point-of-care tools. The most frequently identified barriers to the implementation of acute pain management strategies include lack of knowledge (CPs and patients) and time constraints.

Patients' (and their family's) knowledge of the medicines prescribed for acute pain is vital in reducing medication errors and improving adherence and patient satisfaction. Clinical pharmacists are well positioned to help navigate patients through the complexities of the medication use system, medication access, drug interactions and adverse effects, promote medication adherence, and allow patients to start and complete therapy.

CPs can take on a leadership role in the management of acute pain in the community setting should they be provided with the appropriate tools and financial and educational support. How to do this effectively should be the subject of future research that aims to better understand acute pain pathways, patterns of use of analgesics and best acute pain education delivery models in the community.

# Chapter 6: References


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## Appendix 1: List of literature search strategy search terms for the scoping review on the role of the community pharmacists in the management of acute pain in adults.

(pharmacists OR community pharmacists OR retail pharmacist OR pharmacies OR pharmacy OR pharmacy practice OR community pharmacy practice OR community pharmacy OR community pharmacy services OR pharmacy service OR outpatient pharmacy OR out patient pharmacy OR retail pharmacy OR independent pharmacy OR community pharmacist services OR pharmaceutical services OR pharmaceutical care) AND (role OR scope) AND (acute pain OR acute OR postoperative pain OR acute injury OR acute pain management OR pain management OR self-management OR management OR monitoring) AND (intervention OR practice OR service OR initiative OR tool OR program) AND (patient compliance OR patient adherence OR patient medication OR medication adherence OR persistence OR patient monitoring) AND (adults OR human OR men OR women OR patient) AND (outcome assessment OR patient outcome assessment OR acute pain outcome OR pain outcome OR treatment outcome OR risk assessment) AND (barriers OR challenges OR limitations OR facilitators) AND (post-discharge OR community-dwelling OR community)

# Appendix 2.1: Medline Search Strategy

| Search Strategy (MeSH terms and Keywords) | | Results |
|---|---|---|
| 1 | Acute Pain/ or Musculoskeletal Pain/ or Myalgia/ or Pain, Postoperative/ or Breakthrough Pain/ or Back Pain/ or Low Back Pain/ or Neck Pain/ or Renal Colic/ or Toothache/ or Abdomen, Acute/ or Analgesics, Opioid/ or Analgesics/ or Analgesics, Non-Narcotic/ or Analgesics, Short-Acting/ or Anti-Inflammatory Agents, Non-Steroidal/ or Cyclooxygenase inhibitors/ or Cyclooxygenase 2 Inhibitors/ | 276762 |
| 2 | ((pain* adj6 (acute or post-op* or postop* or breakthrough* or post-dental* or post-procedur* or fractur* or muscolo* or skelet* or post-fractur*)) or renal colic or myalgia or toothache or acute abdominal or analgesics, opioid or analgesics or analgesics, non-narcotic or analgesics, short-acting or anti-inflammatory agents, non-Steroidal or cyclooxygenase inhibitors or cyclooxygenase 2 inhibitors).tw,kf. | 130158 |
| 3 | 1 or 2 | 354251 |
| 4 | Pharmacists/ or Pharmaceutical Services/ or Pharmacy/ or Evidence-Based Pharmacy Practice/ or Pharmacies/ or Pharmacy Residencies/ or Community Pharmacy Services/ or Medication Therapy Management/ or Pharmaceutical Services, Online/ or Prescription Drug Monitoring Programs/ or Drug Substitution/ | 43157 |
| 5 | (pharmac* adj3 (communit* or retail*)).tw,kf. | 9574 |
| 6 | 4 or 5 | 46922 |
| 7 | Program Development/ or Patient Education as Topic/ or Patient Education Handout/ or exp Health Education/ or Patient Participation/ or Consumer Health Information/ or Healthy People Programs/ or Medication Adherence/ | 325287 |
| 8 | (intervention* or practice* or service* or initiative* or tool* or program*).tw,kf. | 3707543 |
| 9 | 7 or 8 | 3876211 |
| 10 | 3 or 6 or 9 | 768 |
| 11 | Opiate Substitution Treatment/ | 3672 |
| 12 | 10 not 11 | 750 |
| 13 | 11 not 10 | 18 |
| 14 | (exp child/ or exp infant/ or adolescent/) not exp adult/ | 1965489 |
| 15 | (newborn* or new-born* or neonat* or neo-nat* or infan* or child* or adolesc* or paediatr* or pediatr* or baby* or babies* or toddler* or kid or kids or boy* or girl* or juvenile* or teen* or youth* or pubescen* or preadolesc* or prepubesc* or preteen or tween).ti. | 1587956 |
| 16 | (pediatr* or paediatr* or neo?nat*).jw. | 627635 |
| 17 | 14 or 15 or 16 | 2591096 |
| 18 | 12 not 17 | 729 |
| 19 | limit 18 to yr="1990 -Current" | 735 |

# Appendix 2.2: Embase Search Strategy

| Search Strategy (Emtree terms and Keywords) | | Results |
|---|---|---|
| 1 | Acute Pain/ or Musculoskeletal Pain/ or Myalgia/ or Pain, Postoperative/ or Breakthrough Pain/ or Back Pain/ or Low Back Pain/ or Neck Pain/ or Renal Colic/ or Toothache/ or Abdomen, Acute/ or Analgesics, Opioid/ or Analgesics/ or Analgesics, Non-Narcotic/ or Analgesics, Short-Acting/ or Anti-Inflammatory Agents, Non-Steroidal/ or Cyclooxygenase inhibitors/ or Cyclooxygenase 2 Inhibitors/ | 566021 |
| 2 | ((pain* adj6 (acute or post-op* or postop* or breakthrough* or post-dental* or post-procedur* or fractur* or muscolo* or skelet* or post-fractur*)) or renal colic or myalgia or toothache or acute abdominal or analgesics, opioid or analgesics or analgesics, non-narcotic or analgesics, short-acting or anti-inflammatory agents, non-Steroidal or cyclooxygenase inhibitors or cyclooxygenase 2 inhibitors).tw,kw. | 187851 |
| 3 | 1 or 2 | 667673 |
| 4 | Pharmacists/ or Pharmaceutical Services/ or Pharmacy/ or Evidence-Based Pharmacy Practice/ or Pharmacies/ or Pharmacy Residencies/ or Community Pharmacy Services/ or Medication Therapy Management/ or Pharmaceutical Services, Online/ or Prescription Drug Monitoring Programs/ or Drug Substitution/ | 611699 |
| 5 | (pharmac* adj3 (communit* or retail*)).tw,kw. | 18555 |
| 6 | 4 or 5 | 615187 |
| 7 | Program Development/ or Patient Education as Topic/ or Patient Education Handout/ or exp Health Education/ or Patient Participation/ or Consumer Health Information/ or Healthy People Programs/ or Medication Adherence/ | 415837 |
| 8 | (intervention* or practice* or service* or initiative* or tool* or program*).tw,kw. | 4907436 |
| 9 | 7 or 8 | 5119255 |
| 10 | 3 and 6 and 9 | 6636 |
| 11 | Opiate Substitution Treatment/ | 2682 |
| 12 | 10 not 11 [all final results] | 6624 |
| 13 | limit 12 to (book or book series) | 5 |
| 14 | 12 not 13 [final, books removed] | 6619 |
| 15 | limit 14 to (conference abstracts or conference abstract status or conference abstract or conference paper or "conference review" or conference proceeding) | 2629 |
| 16 | 14 not 15 [final, no conference material] | 3990 |
| 17 | limit 15 to yr="2019 -Current" [conference materials from the last 2 years] | 689 |
| 18 | 16 or 17 | 4679 |
| 19 | limit 18 to yr="1990 -Current" | 4529 |
| 20 | 4 and 7 | 43646 |
| 21 | (pharmac* adj3 (communit* or retail*) adj6 (intervention* or practice* or service* or initiative* or tool* or program*)).tw,kw. | 6157 |
| 22 | 20 or 21 | 48868 |
| 23 | 3 and 22 | 1169 |
| 24 | 23 not 11 | 1166 |
| 25 | limit 24 to yr="1990 -Current" | 1138 |

*** Emtree is Embase's equivalent of MeSH terms**

# Appendix 2.3: CINAHL Search Strategy

| Search Strategy (MeSH terms and Keywords) | | Results |
|---|---|---|
| 1 | TI(Acute Pain or Musculoskeletal Pain or Myalgia or Postoperative Pain or Breakthrough Pain or Back Pain or Low Back Pain or Neck Pain or Renal Colic or Shoulder Pain or Toothache or Acute Abdomen or Opioid Analgesics or Analgesics or Non-Narcotic Analgesics Non-Narcotic or Short-Acting Analgesics or Non-Steroidal Anti-Inflammatory Agents or Cyclooxygenase inhibitors or Cyclooxygenase 2 Inhibitors) OR AB(Acute Pain or Musculoskeletal Pain or Myalgia or Postoperative Pain or Breakthrough Pain or Back Pain or Low Back Pain or Neck Pain or Renal Colic or Shoulder Pain or Toothache or Acute Abdomen or Opioid Analgesics or Analgesics or Non-Narcotic Analgesics Non-Narcotic or Short-Acting Analgesics or Non-Steroidal Anti-Inflammatory Agents or Cyclooxygenase inhibitors or Cyclooxygenase 2 Inhibitors) | 77270 |
| 2 | (TI(pain* N6 (acute or post-op* or postop* or breakthrough* or post-dental* or post-procedur* or fractur* or muscolo* or skelet* or post-fractur*)) or renal colic or myalgia or toothache or acute abdominal or opioid analgesics or analgesics or non-narcotic analgesics or short-acting analgesics or non-steroidal anti-inflammatory agents or cyclooxygenase inhibitors or cyclooxygenase 2 inhibitors)) OR (AB(pain* N6 (acute or post-op* or postop* or breakthrough* or post-dental* or post-procedur* or fractur* or muscolo* or skelet* or post-fractur*)) or renal colic or myalgia or toothache or acute abdominal or opioid analgesics or analgesics or non-narcotic analgesics or short-acting analgesics or non-steroidal anti-inflammatory agents or cyclooxygenase inhibitors or cyclooxygenase 2 inhibitors)) | 91503 |
| 3 | 1 or 2 | 126791 |
| 4 | TI(Pharmacists or Pharmaceutical Services or Pharmacy or Evidence-Based Pharmacy Practice or Pharmacies or Pharmacy Residencies or Community Pharmacy Services or Medication Therapy Management or Online Pharmaceutical Services or Prescription Drug Monitoring Programs or Drug Substitution) OR AB(Pharmacists or Pharmaceutical Services or Pharmacy or Evidence-Based Pharmacy Practice or Pharmacies or Pharmacy Residencies or Community Pharmacy Services or Medication Therapy Management or Online Pharmaceutical Services or Prescription Drug Monitoring Programs or Drug Substitution) | 41415 |
| 5 | (TI (pharmac* N3 (communit* or retail*))) OR (AB (pharmac* N3 (communit* or retail*))) | 5526 |
| 6 | 4 or 5 | 40656 |
| 7 | TI(Program Development or Patient Education as Topic or Patient Education Handout or exp Health Education or Patient Participation or Consumer Health Information or Healthy People Programs or Medication Adherence) OR AB(Program Development or Patient Education as Topic or Patient Education Handout or exp Health Education or Patient Participation or Consumer Health Information or Healthy People Programs or Medication Adherence) | 16276 |

| | | |
|---|---|---|
| 8 | (TI (intervention* or practice* or service* or initiative* or tool* or program*)) OR (AB (intervention* or practice* or service* or initiative* or tool* or program*)) | 1522714 |
| 9 | 7 or 8 | 1518923 |
| 10 | 7 and 8 and 9 | 938 |
| 11 | TI(Opiate Substitution Treatment) OR AB(Opiate Substitution Treatment) | 64 |
| 12 | 10 not 11 | 937 |
| 13 | TI (newborn* or new-born* or neonat* or neo-nat* or infan* or child* or adolesc* or paediatr* or pediatr* or baby* or babies* or toddler* or kid or kids or boy* or girl* or juvenile* or teen* or youth* or pubescen* or preadolesc* or prepubesc* or preteen or tween) | 619989 |
| 14 | SO (pediatr* or paediatr*) | 190011 |
| 15 | 13 or 14 | 695342 |
| 16 | 12 not 15 | 902 |
| 17 | EM 1990- | 7059760 |
| 18 | 16 and 17 | 856 |

# Appendix 2.4: Scopus Search Strategy

| Search Strategy (MeSH terms and Keywords) | | Results |
|---|---|---|
| 1 | TITLE-ABS-KEY(pain* W/6 (acute or post-op* or postop* or breakthrough* or post-dental* or post-procedur* or fractur* or muscolo* or skelet* or post-fractur*)) | 148615 |
| 2 | TITLE-ABS-KEY(renal colic or myalgia or toothache or acute abdominal or analgesics, opioid or analgesics or analgesics, non-narcotic or analgesics, short-acting or anti-inflammatory agents, non-Steroidal or cyclooxygenase inhibitors or cyclooxygenase 2 inhibitors) | 88 |
| 3 | 1 or 2 | 148659 |
| 4 | TITLE-ABS-KEY(pharmac* W/3 (communit* or retail*)) | 16095 |
| 5 | TITLE-ABS-KEY(intervention* or practice* or service* or initiative* or tool* or program*) | 11665989 |
| 6 | 3 and 4 and 5 | 24 |
| 7 | TITLE-ABS-KEY(Opiate AND Substitution AND Treatment) | 5832 |
| 8 | 6 AND NOT 7 | 23 |
| OR | OR | |
| 9 | TITLE-ABS-KEY("Opiate Substitution Treatment") | 4271 |
| 10 | 6 AND NOT 9 | 24 |

# Appendix 2.5: Cochrane Search Strategy

| Search Strategy (MeSH terms and Keywords) | | Results |
|---|---|---|
| 1 | [mh "Acute Pain"] or [mh "Musculoskeletal Pain"] or [mh Myalgia] or [mh "Pain, Postoperative"] or [mh "Breakthrough Pain"] or [mh "Back Pain"] or [mh "Low Back Pain"] or [mh "Neck Pain"] or [mh "Renal Colic"] or [mh "Toothache"] or [mh "Abdomen, Acute"] or [mh "Analgesics, Opioid"] or [mh "Analgesics"] or [mh "Analgesics, Non-Narcotic"] or [mh "Analgesics, Short-Acting"] or [mh "Anti-Inflammatory Agents, Non-Steroidal"] or [mh "Cyclooxygenase inhibitors"] or [mh "Cyclooxygenase 2 Inhibitors"] | 39151 |
| 2 | ((pain* NEAR/6 (acute or post-op* or postop* or breakthrough* or post-dental* or post-procedur* or fractur* or muscolo* or skelet* or post-fractur*)) or renal colic or myalgia or toothache or acute abdominal or analgesics, opioid or analgesics or analgesics, non-narcotic or analgesics, short-acting or anti-inflammatory agents, non-Steroidal or cyclooxygenase inhibitors or cyclooxygenase 2 inhibitors):ti,ab,kw | 92074 |
| 3 | #1 or #2 | 98473 |
| 4 | [mh "Pharmacists"] or [mh "Pharmaceutical Services"] or [mh "Pharmacy"] or [mh "Evidence-Based Pharmacy Practice"] or [mh "Pharmacies"] or [mh "Pharmacy Residencies"] or [mh "Community Pharmacy Services"] or [mh "Medication Therapy Management"] or [mh "Pharmaceutical Services, Online"] or [mh "Prescription Drug Monitoring Programs"] or [mh "Drug Substitution"] | 2152 |
| 5 | (pharmac* NEAR/3 (communit* or retail*)):ti,ab,kw | 1320 |
| 6 | #4 or #5 | 3082 |
| 7 | [mh "Program Development"] or [mh "Patient Education as Topic"] or [mh "Patient Education Handout"] or [mh "exp Health Education"] or [mh "Patient Participation"] or [mh "Consumer Health Information"] or [mh "Healthy People Programs"] or [mh "Medication Adherence"] | 13424 |
| 8 | (intervention* or practice* or service* or initiative* or tool* or program*):ti,ab,kw | 578085 |
| 9 | #7 or #8 | 580349 |
| 10 | #3 and #6 and #9 | 112 |
| 11 | [mh "Opiate Substitution Treatment"] | 335 |
| 12 | #10 not #11 | 111 |

# Appendix 3: Scoping Review Data Extraction Tool

**A. STUDY CHARACTERISTICS**

**Authors & Study Details**

1. Author's name:
2. Sponsorship source:
3. Country of origin:
4. Study setting:

**Additional Information**

1. Article title:
2. Data source (community pharmacy, emergency department, regional/national/international database):
3. Journal, year of publication, volume, number and page:
4. Keywords:
5. Publication source of study (e.g., Database):
6. Study aim(s)/Research question(s)/Objective(s):

**Methods**

1. Study design:
2. Briefly describe the methodology:
3. Which pain condition(s) and target population were considered (describe briefly):
4. Characteristics of pain management practice(s) or intervention(s) (if possible, describe briefly):
5. Characteristics of pain management comparator(s) (if possible, describe briefly):
6. Follow-up of patients, if any:
7. Primary outcome (list and briefly describe):
8. Secondary outcome(s) (list and briefly describe):
9. Study period (start and finish dates):

10. Time points of assessment, if any:

**Eligibility criteria**

1. Inclusion criteria:

2. Exclusion criteria:

**B. TARGET PATIENT POPULATION CHARACTERISTICS**

1. Group label (If present, describe the group labels):

2. Data source (target population):

3. Sample size:

4. Mean (or median) age:

5. Sex/gender (%F/%M):

6. Race and ethnicity (if that variable was ascertained):

7. List of pain experience(s)/condition(s)/reason for visit(s):

8. Other characteristics of enrolled subjects (relevant to study):

**C. COMMUNITY PHARMACIST (CP) CHARACTERISTICS**

1. CPs' site of practice:

2. CPs' specialization, if available:

3. CPs' length of time in practice, if available:

4. Other characteristics of CPs (relevant to study):

**D. KEY FINDINGS ON PRIMARY & SECONDARY OUTCOMES**

1. List and briefly describe the key results:

**E. CP ENGAGEMENT CHARACTERISTICS**

1. List and briefly describe barriers in CPs' engagement in acute pain management:

2. List and briefly describe facilitators in CPs' engagement in acute pain management:

# Appendix 4: Scoping Review Thematic Analysis Codes and Quotes

| Acute Pain Management Interventions or Practices in a Community Pharmacy Setting | | | | |
|---|---|---|---|---|
| **Theme** | **Subtheme 1** | **Subtheme 2** | **Subtheme 3** | **Quotes** |
| Recommended Interventions for Community Pharmacists (CPs) (e.g. Systems and procedures implemented by the Healthcare System for Community Pharmacists) | Educational Interventions to Asses & Expand the Role of Community Pharmacists in Acute Pain Care & Management | | | |
| | | Educational Workshops (e.g., More Knowledge-based and Theoretical. Not as Interactive or In-Person Workshops. Can be performed on an online electronic platform) to Expand Community Pharmacists Current Role & Recommendations in Acute Pain Care & Management | | "2-h educational workshop on the evidence-based management of LBP. This workshop covers the LBP care pathway, simple screening strategies, and guidelines on when to refer patients for treatment. This also encouraged a discussion with patients about medication and condition history and prompt a referral where necessary."<br><br>"The desirable aspects of the workshop including its clarity, relevance, and usefulness to everyday practice (focus on theoretical, clinical, and practical information on pain, new information around dose recommendations and advice to stay active), method of delivery, no cost, and obtaining complementary perspectives on the subject from different healthcare professionals."<br><br>"Educational workshop: 2-hour workshop on evidence-based management of LBP (e.g., Prevalence, economic and social burden; Health-seeking behavior among people with LBP; Pharmacological management; Non-pharmacological management including follow-up and review; Identifying simple backache and distinguishing this from signs/symptoms of more complex disease including information gathering and screening for possible 'red flags.'; motivation and encouragement of physical activity; providing re-assurance of a favorable prognosis)."<br><br>"CPs participated in an educational workshop divided into two sections. The first (4 h) was held by a rheumatologist and gave CPs specific and detailed training on LBP symptomatology and its evidence-based management; the second (1.5 h) was focused on the study protocol, patient recruitment, and data collection."<br><br>"Interventions addressed include: Topical analgesics, oral analgesics, and educational interventions where CPs can counsel patients on the most appropriate self-medication strategy or support them in following the medical prescription correctly." |

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| | | | | "A key-point of the role of community pharmacies in the management of LBP was the establishment of educational interventions to toughen the CPs' knowledge and patients' consciousness."<br><br>"Educational interventions of 2.5 h seemed to be particularly effective in patients with acute LBP."<br><br>"Pharmacist staff allocated to the pamphlet and education intervention were provided with specific training. This training was conducted as pre-trial workshops (HS), during which pharmacists were instructed about the key pamphlet messages to reinforce and were advised about the necessity of delivering these messages strictly in accordance with the pamphlet content." |
| | | Educational Training Sessions<br>(e.g., More Interactive & In-Person Training Courses for Community Pharmacists) to Expand Community Pharmacists Current Role & Recommendations in Acute Pain Care & Management | | "Face-to-face training session for community pharmacists on acute LBP screening and management (0.5-1h)."<br><br>"PACE clinical trial: 1-hour one-to-one training session delivering information on the evidence-based management of LBP, screening for red flag conditions (signs/symptoms of a serious disease), and screening for eligibility into the trial. This includes follow-up questionnaires and follow-up telephone calls."<br><br>"3. Educational training program for pharmacists: Pharmacists delivering MAS were trained for 7.5 hours by researchers and GPs. Training aimed to ensure pharmacists' competency in delivering the service, clinical areas, consultation skills, red flag and other referral criteria, documentation and technology systems. The workshop involved a combination of material, lectures and interactive sessions. 4. Practice change support for pharmacists: Pharmacists delivering MAS were provided 1 hour monthly visits at the pharmacy consisting of support and on-site training by a practice change facilitator (PCF). The PCF monitored data quality, recruitment and intervention fidelity. PCFs were trained to ensure these objectives were met. PCFs also addressed barriers to change using evidence-based strategies and collected both quantitative and qualitative data."<br><br>"A 4-h training session, informed by previous studies, was delivered at each center. The training focused on delivering a standardized performance while responding naturally to pharmacy personnel questions. Participating pharmacies were scheduled to receive one SP visit per minor ailment, i.e. four visits per pharmacy (72 visits in total) over an 8-week period."<br><br>"The 'PainWISE' programme, an initiative in which community pharmacists undertake extensive additional training in both acute and chronic pain management and are perfectly placed to interact with patients and identify any issues that may warrant referral." |

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| | | | | "Education and training needs - When asked about the benefits of education and/or training concerning back pain, 93.1% (297/319) of respondents agreed that they would benefit personally and 93.5%(289/309) agreed that their staff would benefit."<br><br>"Pharmacist staff allocated to the pamphlet education intervention were provided with specific training. This training was conducted as pre-trial workshops (HS), during which pharmacists were instructed about the key pamphlet messages to reinforce and were advised about the necessity of delivering these messages strictly in accordance with the pamphlet content." |
| | | Educational Simulated Patient Scenario Visits to Assess Community Pharmacists Current Role & Recommendations in Acute Pain Care & Management | | "2 standardized back pain clinical scenarios were used. For both scenarios, there was standardized case information that was mandatory to convey and other information that would be elicited only if the pharmacist or non-pharmacist staff member asked the relevant question."<br><br>"Simulated patient visits: To assess the quality of care obtained from retail drug outlets located within communities. When combined with feedback, they can also be a useful means of promoting rational utilization of OTC medicines."<br><br>" Scenario 1: Intermittent back pain - 32-year-old male (No previous/current medical condition besides pain, not taking any analgesic/medications and pain started in the morning when he bent over to pick up his cloth and worsens during coughing) with a complaint of intermittent pain in both sides of his lower back. The pharmacist was expected to rule out other medical conditions and advise the simulated patient to take paracetamol, if insufficient advice non-steroidal anti-inflammatory drugs (NSAIDS) or weak opioids, and to visit the nearby hospital if the symptom still persists.<br>- For the back pain scenario, the most common medications dispensed were oral analgesics and contained non-steroidal anti-inflammatory drugs (NSAIDs) alone and/or in combination with paracetamol. Ibuprofen alone or in combination with paracetamol was the most commonly dispensed analgesics. Combining paracetamol with various NSAIDs has been shown to produce better pain relief and control, a major fear is unintentional paracetamol overdoses and toxicity by patients, predisposing to potentially deleterious outcomes.<br>- Qualitative semi-structured interviews (30 minutes): to uncover the potential barriers to the provision of management services for minor ailments in a community pharmacy setting. Included open-ended questions probing the potential barrier in the management of minor ailments in community pharmacy settings and evolved iteratively as discussions proceeded.<br>- Dispensed medication(s) - Asks drug allergies - Instruction on dose and duration - Counsel on side effects - Queries about past |

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| | | | | medical and medication history - Advice to visit a physician - non-pharmacological advice."<br><br>" - Simulated Patient (SP) visits testing the management of four minor ailments. Scenario: four minor ailments (most common in ED) covered includes back pain, vomiting and diarrhea, sore throat, and eye discomfort. Back Pain Simulated Scenario - Presentation: I need something for my back (female). - Symptoms, If asked: Pain in her lower back. The pain began this morning when she bent over to pick up her trousers. The pain is on both sides of her lower back, and has continued on and off since when bending and coughing. No other symptoms; she feels well otherwise. - History, if asked; 38 years old. Doesn't usually have aproblem back. No previous trauma. No sudden weight loss. No relevant lifestyle issues. The current job doesn't involve physical work. Nothing alleviates or worsens the symptoms. No other medical conditions. - Treatment, if asked: Not using any medicines. No known drug allergies. No action taken. No simple analgesia at home.<br>- A 4-h training session, informed by previous studies, was delivered at each center. The training focused on delivering a standardized performance while responding naturally to pharmacy personnel questions. Participating pharmacies were scheduled to receive one SP visit per minor ailment, i.e. four visits per pharmacy (72 visits in total) over an 8-week period.<br>- Most (96%, n=65) visits resulted in the sale of a product; Advice alone was the outcome of three visits. One-third of visits involved interaction with a pharmacist only."<br><br>"In the next section, pharmacists were presented with a series of hypothetical case scenarios of patients presenting to the pharmacy with symptoms of either fever or pain with different severities. The case scenarios are patient-based presentations typically seen in an Australian community pharmacy setting. Examples of scenarios include: general mild to severe musculoskeletal pain, headaches, migraines, osteoarthritis and fever; as well as preference for treatment options relating to adults and paediatric assessments of fever. Pharmacists were provided with a number of different available treatment (no brand names were used) and referral options, and were asked to select their preferred treatment strategy in each case (given that there are no contraindications in the case scenarios)."<br><br>"A study based on a simulated patient methodology including community pharmacies in Slovenia showed that the most common information provided was dosage and adverse effects, but that patients who presented their symptoms were offered more thorough counseling than patients who directly requested a product (Horvat, Koder, & Kos, 2012)." |

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| | | | | "The researcher will present themselves to the community pharmacist as a patient/customer and ask for a medication to treat back pain (lower back and localized) for her grandfather. A set of questions would be asked as prompts for the pharmacist to ask more patient-oriented questions before recommending a treatment. After discussing the problem and receiving advice from the pharmacist, a purchase of the medication was either made or not made. All information was recorded in a data collection form. (Topics covered: Medical history, age of patient, cause of pain, duration of pain, location of pain, description of pain, current medications, see a doctor, etc.)" |
| | | Semi-Structured Interviews of Community Pharmacists Conducted by Researchers<br>to Assess Community Pharmacists Current Role & Recommendations in Acute Pain Care & Management | | "Qualitative semi-structured interviews (30 minutes): to uncover the potential barriers to the provision of management services for minor ailments in a community pharmacy setting. Included open-ended questions probing the potential barrier in the management of minor ailments in community pharmacy settings and evolved iteratively as discussions proceeded."<br><br>"A third-party consultant and the Chair of this multidisciplinary panel (R.H.H.) conducted 1-on-1 interviews with family physicians, a gastroenterologist, a hepatologist, an internist, a rheumatologist, and a pharmacist to solicit unprompted feedback on the particular issues that each felt to be important. This feedback was summarized into a comprehensive list that was distributed to all panel members who were then asked to select the topics they thought were most important. These topics then formed the basis for discussion during a day-and-a-half meeting of the panel." |
| | | Educational Questionnaire or Survey Completed by Community Pharmacists<br>to Assess Community Pharmacists Current Role & Recommendations in Acute Pain Care & Management | | "Educational Intervention: 6 open-ended questions framed to draw pharmacists' opinions on the two core areas specified in the aims. An inductive exploration of pharmacists' responses was carried out by one reviewer and responses were grouped into relevant themes. Responses from pharmacist recruiters were compared to those of non-recruiters to determine similarities and differences in opinions on questionnaire items. Ex of topic practices addressed: Paracetamol, NSAIDS, rest, Referral to GP, Rubefacient, Ice, avoid risks, activity, heat, physiotherapy, codeine (combination), and back support." Questionnaires were circulated to all GDPs and pharmacists. Information on which OTC analgesics (ranking) are recommended by general dental practitioners (GDPs) and pharmacists was sought as part of a larger survey on the overall use of OTC medication relevant to dentistry. Each question prompted for a common generic; namely aspirin, ibuprofen, paracetamol, aspirin and codeine, paracetamol and codeine, with additional categories of others, and a topical agent-clove oil. 2 reminders were sent."<br><br>"A cross-sectional survey (The Beliefs about Risks and Benefits of Treatments Questionnaire) of healthcare practitioners in the UK was posted online comparing the views of all healthcare providers (traditional- and CAM-trained) considered using the exemplar |

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| | | | | neck, shoulder, and upper arm pain (a common clinical musculoskeletal problem to pose scenario-based questions) to explore the perceived risks and benefits of different types of therapeutic intervention using a mathematical cluster approach (PCA). The questionnaire includes the usual routes by which the patients came to them and to whom such patients might be referred on by them and the Benefits and Risks of Treatment Questionnaire. The questionnaire assesses the benefits, their opinions, and the risks of the following therapeutic modalities: Herbal remedies, homeopathy, acupuncture, antidepressants, chiropractic, reiki, anti-inflammatory drugs, osteopathy, reflexology, physiotherapy, steroid joint injections, paracetamol, chinese medicine, physiotherapy, aromatherapy, and steroid treatment."<br><br>"Poor response rate amongst the pharmacists (25%) possibly due to pharmacists perceiving the questionnaire to be of less relevance to them because it did not directly refer to medicines or devices until later and retrospectively, it may have been off-putting that the first page enquired about patients with neck/shoulder and upper arm pain."<br><br>" An online survey was carried out among pharmacists practicing in the province of Quebec, Canada. Section 1: how often pharmacist participants observed specific concerns regarding physicians' prescribing practices, such as drugs and co-analgesia most frequently prescribed, pharmacotherapy-related problems, and patient management. Section 2: pharmacists' behaviors and their frequency of disagreeing with an opioid prescription issued by a physician or when they dispensed opioids to patients. Section 3: issues in the physician-pharmacist relationship, such as frequency and ease of communication and how often they occurred. Section 4: pharmacists' training needs regarding opioid dispensing and patient management. Section 5: sociodemographic and professional characteristics of pharmacist participants."<br><br>"The questionnaires were divided into four basic sections. The first section requested details on numbers of staff available, independent, or multiple, client use of the pharmacy and requests for advice. The second section enquired on the range of oral health products available and the basis for any particular product recommendations. The third section tested knowledge of local dental practice whereabouts and appointment arrangements. The final section was about usage of pharmacies for promotional activities and improvements in passing on the oral health message to clients. Each pharmacy was visited and the questionnaires discussed and completed. The recommendations given to these patients were to visit a dentist and they were supplied with short-term pain relief or referral to a dentist." |

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| | | | | "Cross-sectional survey to capture current practices for acute pain management and assess views on clinical guidelines -> Treatment options for Musculoskeletal pain (Paracetamol, ibuprofen, diclofenac, aspirin, Paracetamol/ibuprofen, ibuprofen gel, diclofenac gel, referral, other/s."<br><br>"The main body of the questionnaire consisted of questions relating to daily pharmacy practice observations, which included questions on the most common types of pain, and the frequency of over-the-counter (OTC) analgesic requests. In the next section, pharmacists were presented with a series of hypothetical case scenarios of patients presenting to the pharmacy with symptoms of either fever or pain with different severities. The case scenarios are patient-based presentations typically seen in an Australian community pharmacy setting. Examples of scenarios include: general mild to severe musculoskeletal pain, headaches, migraines, osteoarthritis and fever; as well as preference for treatment options relating to adults and paediatric assessments of fever. Pharmacists were provided with a number of different available treatment (no brand names were used) and referral options, and were asked to select their preferred treatment strategy in each case (given that there are no contraindications in the case scenarios)."<br><br>"Questionnaire on current perceptions and knowledge of community pharmacies with pain management (chronic/acute) -> Dispensing and counselling patients on pain analgesics, adverse effects and medication interactions."<br><br>"Closed-ended questions from a questionnaire covering the demographic of the practicing pharmacist (e.g. age, nationality, qualification, and year of graduation), the relationship of the pharmacists and the practicing dentists in that area (e.g. timing and visit to the pharmacy), the current range of oral health products available and the basis for any particular product recommendations from the dentists, the interaction of the pharmacist to the customers (e.g. the level of attitude and knowledge of the pharmacist on oral health and oral hygiene products and passing the message to the patient), and the dental patients attending the pharmacies (e.g. their number, common complaints and advices regarding dental problems)."<br><br>"A cross-sectional survey among a sample of pharmacists in Chennai city. Data regarding knowledge and attitudes toward oral health care and oral hygiene products were obtained using a closed-ended questionnaire (18 closed-ended questions)."<br><br>"The questionnaire was divided into four sections: section I dealt with details regarding the vicinity of the dentist to the pharmacy, their appointment details, and the frequency with which the |

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| | | | | pharmacist met the dentist. Section II focused on the range of dental products stocked in the pharmacy. Section III dealt with the advice given by the pharmacist to customers regarding oral hygiene products and oral health, while section IV dealt with the pharmacists source of information regarding oral health and oral hygiene, the barriers faced by them, and also methods to improve their knowledge and attitudes regarding oral health."<br><br>"- Questionnaires were given to pharmacists attending continuing education workshops (on back pain treatment including pain advice, OTC advice, etc.)<br>- Five sections: • demographic questions about the respondents• attitudes towards back pain and its treatment• frequency and quality of back pain advice in the pharmacy• clinical case studies (2 vignettes)• education and training needs"<br><br>"Survey to explore pharmacist practices in relation to oral health and associated oral healthcare products in Australian community pharmacies."<br><br>"Four sections: Section one consisted of items relating to participant demographics; section two contained eight questions relating to pharmacists' practices, perceived education requirements and attitudes towards providing oral healthcare in the pharmacy; section three contained five items which assessed confidence and frequency/nature of oral healthcare presentations in community pharmacy; and the last section contained nine items eliciting pharmacist knowledge about oral health risks associated with smoking tobacco and smoking cessation preferences. " |
| | Developing & Implementing Electronic Tools<br>to Assist Community Pharmacists with the Assessment of Patient's Condition and Recommendations in Acute Pain Care & Management | | | " 2. Use of Integrated technology platforms agreed with GPs such as HealthPathways (protocolized evidence-based clinical care pathways specific to each ailment. The clinical pathways for each ailment were used by community pharmacists to guide consultation with their patients. Each pathway had the same structure and included assessment and management specific to each ailment) and HealthLink (a direct secure messaging system allowing for bidirectional communication between the community pharmacist and the GP)."<br><br>"Cross-platform Web app using an iterative user-centered design process during interface design, clinical reasoning, program development, and evaluation - A clinical decision support system (CDSS) was developed for pharmacists to assist in determining care plans for treating LBP in CP setting. This approach sought to uncover pharmacist training and procedural constraints that may impact pharmacist decision making for LBP. The design goals of this CDSS were to (1) support pharmacists to offer simple, clear evidence-based advice to the pharmacy client who presents with LBP; (2) integrate with the pharmacist workflow (eg, consideration of medicines during decision making); (3) maximize time efficiency; |

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| | | | | and (4) provide a personalized report of recommendations for the pharmacy client.<br>- These statements broadly reflected agreement with advice generated by the CDSS. -> Pharmacist #2: Its prompting you to ask questions (some questions we probably don't always ask, but we need to be asking)."<br><br>" - Across the 5 case vignettes, 70 recommendations were generated by the CDSS related to self-care advice, medicine advice, and referral advice. Pharmacists accepted 90% (18/20) of self-care recommendations, 100% (25/25) of medicines recommendations, and 88% (22/25) of referral recommendations. Of those accepted, pharmacists added to the advice for 8% (5/65) of the recommendations generated by the CDSS. "Consider using a heat wrap and medicine containing NSAID for up to 2 weeks (check for contraindications). Also, ADD PHYSIO CREAM as required."<br><br>"- Community pharmacists rated the overall usability (based around simple use of language, logical workflow, brief consultation time, ability to customize advice, and convenience of a customized handout for the client) of the high-fidelity protype as good to excellent despite expression of some negative sentiment in relation to guidance in screening for serious causes of LBP and interface inconsistency. - There was a high level of acceptance for the advice generated by the CDSS for self-care, medicines, and referral, with pharmacists augmenting advice for a minority (5/65) of recommendations.<br>- All pharmacists agreed that the information provided by the CDSS was applicable to the clinical scenarios presented and could potentially improve client-pharmacist encounters."<br><br>"- Pharmacists also commented that the CDSS helped them to ask more questions of the client with LBP and increased management options for LBP beyond their usual advice."<br><br>"- Pharmacists commented that they appreciated guidance provided by the CDSS in relation to management, particularly for options beyond medicines advice. This aligns with the potential benefit of tools/guidelines to support pharmacists when managing clients with LBP."<br><br>" He changed participants' drugs according to a pre-defined algorithm, taking into account their preferences, adherence, and potential drug interactions. The protocol permitted three to six sessions of approximately 20 minutes' duration over a 10 week period. In follow-up visits, MP monitored the effectiveness and acceptability of drugs and recommended changes as necessary. This could optimize the drug management of knee pain and |

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| | | | | provide simple self-help messages. Refer to Pharmacy Algorithm for step by step instructions."<br><br>"- 1. Patient Requests for Combination Analgesics Containing Codeine–to guide pharmacists in the decision-making process regarding the appropriateness of CACC and counselling advice to provide with the product. 2. Combination Analgesics Containing Codeine Dependence–to help pharmacists identify CACC dependence, initiate a patient discussion and provide advice/referrals. To increase uptake and utilization of the tool by pharmacists a continuing professional development (CPD) package was developed."<br><br>"- the Opioid Management Team at the Western Victoria Primary Health Network (WVPHN) developed a HealthPathways interactive clinical tool (web-based information portal) centered on OTC CACC management for pharmacists to utilize in everyday practice. Aimed at improving the management of patients requesting OTC CACC products, as well as identification of individuals with dependence and problematic use, and facilitating/referring them to treatment, which has been identified in previous research as a challenge. This is relevant in pharmacy to aid decision making around medication supply and condition management (especially when high-risk medicines are being supplied). The OTCCACC request tool was modified into a pharmacy pain management clinical tool to help pharmacists manage pain appropriately without OTC CACC."<br><br>" A real-time recording and monitoring system for OTC CACC called MedsASSIS: online clinical tool to aid recommendations and management of OTC CACC in Australia CPD Quiz."<br><br>" My CPD website online PDF version of the clinical tool: The majority of pharmacists (83%) were satisfied with the online course and most (91%) found it relevant to their practice."<br><br>"- Over half of the pharmacists that had used the clinical tools found them easy to access (54.3%) and navigate(53.7%). Over a third of pharmacists felt that they had improved their knowledge (39.7%) and confidence (39.1%) and the confidence of their patients (37.1%) and changed their clinical management (39.7%) including the way they made referrals (39.7%)." |
| | Changing Current Evidence-Based Guidelines in Acute Pain Care & Management in The Community Pharmacy Setting | | | "A disease state management (DSM) program for acute LBP management with repeated, regular follow-ups over a 3mo period (1and/or 2 weeks from the initial visit and again 1, 2, and 3 months). This will include either a referral to the doctor or the provision of simple analgesic, advice to stay active and avoid prolonged periods of bed rest, and reassurance of a favourable outcome." |

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| | (protocols, directives, initiatives, role expansion, etc.) | | | "The American college of physicians (ACP) issued an updated clinical practice for the management of acute and subacute low back pain which recommends appropriate exclusion of a serious cause, the reassurance of a favorable prognosis, the need to remain active, avoid periods of bed rest and treatment with non-drug therapies such as superficial heat, massage, acupuncture or spinal manipulation. If drug therapy is desired, NSAIDs or skeletal muscle relaxants must be chosen as the first line. Evidence suggests that pain relief does not differ between traditional OTC NSAIDs and prescription NSAIDs."<br><br>"Awareness of patients' preferences can prevent their returning with symptoms without having filled their prescriptions. should explain what the prescribed drug is for, the benefits and risks of therapy, the length of treatment, and when to return for re-assessment."<br><br>"Enhanced pharmacist medication review was as effective as exercise in the short-term management of pain for patients with knee OA, while the combination of exercise and medication review was shown to be more effective overall than usual care (16). Significantly more individuals in the intervention group described their care as meeting the quality indicators for pain and functional assessment, exercise, education, weight loss, and radiographs."<br><br>"In April 2000, Patient Group Directives (PGD) were introduced to primary care sectors. A PGD is a written direction relating to the supply and/or administration of a prescription-only medication to persons generally. A PGD must be signed by a doctor or dentist and a pharmacist. This new legislation provides an opportunity for extending pharmacists' roles, whether they be pharmacists involved in the drawing up of PGDs or pharmacists authorized to supply or administer under PGD."<br><br>"In the 'new pharmacy contracts' and 'patient group directives' pharmacists could assess and dispense emergency medications when necessary, until a dental appointment can be acquired and thereby reducing the misuse of resources of the general medical practitioner."<br><br>"- Clinical practice guidelines are essential tools for promoting evidence-based practice to support therapeutic decision-making. - According to Australian Medicines Handbook and the Australian Therapeutic Guidelines, management of LBP is dependent on the aetiology and whether the flare up of symptoms is acute or chronic in nature."<br><br>"Pharmacies allocated to intervention groups were encouraged to use their co-operative pharmacy management skills to emphasize |

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| | | | | the biopsychosocial model of care through reinforcement of the following key messages related to both acute and chronic LBP."<br><br>"- Two flow-chart protocols, for headache and back-pain management, were developed using key pharmacy journals, standard textbooks, and other references.<br>- The most commonly presented type of back pain was associated with acute muscle strain (n= 39 cases). Patients complained of lifting too heavy objects, lifting objects improperly and imprudent exercising. The second most common type of back pain was non-specific back pain(n= 10 cases)."<br><br>"Average compliance to the treatment sheet was 33% for the back-pain protocol (range 0–100%)."<br><br>"The assessment of pharmacist interventions was then carried out through their compliance with the protocols (not patient outcomes)." |
| Recommended Interventions for Patients<br>(e.g. Implemented by Pharmacists for Patients) | Developing & Implementing Educational Interventions<br>for Patients in Acute Pain Care & Management | Patient Educational Sessions Implemented by Community Pharmacists<br>to Provide Patients With The Appropriate General Public Education on their Acute Pain Condition & Management | | "Patient educational intervention should always be part of a treatment program. Indeed, short patient education sessions or written information did not seem to be effective as a single treatment."<br><br>"Enhanced pharmacy review (pharmacological management in accordance with an algorithm) ->The aims of this intervention were to optimise pharmacological pain control and to reinforce self-help messages contained in the advice leaflet."<br><br>"The intervention included a validated knee OA (Osteoarthritis) screening questionnaire, education, pain medication management, physiotherapy-guided exercise, and communication with the primary care physician."<br><br>"Provide education on the quality and safe use of medicines + identify interactions between OTC analgesics and concomitant use of the anticoagulant warfarin, and all pharmacists involved recommended alternative OTC analgesics with less likelihood of causing adverse effects - to encourage the trial of alternative pain management strategies that are consistent with the recommendations outlined in clinical therapeutic guidelines."<br><br>"Reassure and provide appropriate information and/or advice."<br><br>"Pharmacists can support patient and provider education and promote appropriate prescribing of opioids. Pharmacists in the community can serve as are source for consultation in developing effective pain management strategies and the identification of patients at risk for opioid abuse and dependence." |
| | | One-on-One Consultations | | "Minor Ailment Service Intervention: To evaluate the impact of an enhanced service compared with current practice. They evaluated |

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| | | (e.g. medication review or management, patient education, advice, referrals, protocols) Covering Discussions on Acute Pain Condition & Management Plan | | four features in this intervention: 1. Standardised consultation for pharmacist-patient intervention where patients received structured face-to-face consultation on presentation to the pharmacy. Pharmacist steps included service offering (explaining the features of the service), clinical assessment (eliciting relevant clinical information and checking for referral symptoms), standardized management (using agreed clinical pathways to proceed with a standardized management approach including provision of self-care advice, non-prescription medicine(s) if appropriate and/or referral to an appropriate health care provider), and documentation and follow-up plan (documenting the consultation in the study data collection form, patient completing the EuroQoL EQ-5D visual analogue scale (VAS) assessment and a direct message was sent to patients' GP of the consultation outcome with patients consent using HealthLink).”<br><br>“The aims of this intervention were to optimise pharmacological pain control and to reinforce self-help messages contained in the advice leaflet. An experienced community pharmacist (MP) provided this service with access to patients’ medical records; it was modeled on the “dependent prescriber” role.”<br><br>“Patients should be advised that, if pain is not adequately controlled on the recommended treatment, they should return to their physicians or clinics rather than take additional nonprescription products that might increase their risk of adverse events.”<br><br>“The intervention included a validated knee OA (Osteoarthritis) screening questionnaire, education, pain medication management, physiotherapy-guided exercise, and communication with the primary care physician.”<br><br>“Participants from the pharmacies assigned to the intervention received one-on-one consultation with a pharmacist. Pharmacists offered education, medication review, and referral to a physiotherapist-guided exercise program.”<br><br>“Enhanced pharmacist medication review was as effective as exercise in the short-term management of pain for patients with knee OA, while the combination of exercise and medication review was shown to be more effective overall than usual care (16). Significantly more individuals in the intervention group described their care as meeting the quality indicators for pain and functional assessment, exercise, education, weight loss, and radiographs.”<br><br>“The following individual quality indicator pass rates were significantly higher in those from intervention pharmacies compared to the usual care group: pain and functional |

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| | | | | assessment, exercise, education, weight loss, and knee radiographs."<br><br>"The most important outcome of this trial was the marked improvement in participants' overall quality of OA care for the intervention arm compared to the usual care arm."<br><br>"Patient Education"<br><br>"Guidelines suggest patients be educated on benefits of regular dosing of paracetamol given that this dosing regimen increases the analgesic potential of the drug. - In 2011 found that 82% of LBP patients who were self-managing their symptoms with paracetamol were under-dosing."<br><br>"Pharmacists offer detailed analgesic medication reviews that are aimed to identify and address issues with medication safety and adherence."<br><br>"As an additional outcome of the medication review service, pharmacists are ideally placed to refer their patients to relevant health professionals if need be."<br><br>"Pharmacists offer detailed analgesic medication reviews that are aimed to identify and address issues with medication safety and adherence."<br><br>"Due to their extensive pharmacology education, pharmacists are also ideally placed to identify medication interactions that may cause harm - provide education on the quality and safe use of medicines + identify interactions between OTC analgesics and concomitant use of the anticoagulant warfarin, and all pharmacists involved recommended alternative OTC analgesics with less likelihood of causing adverse effects."<br><br>"To encourage the trial of alternative pain management strategies that are consistent with the recommendations outlined in clinical therapeutic guidelines."<br><br>"Pharmacological counselling provided by pharmacists: some reported that pharmacists lacked empathy and listening skills."<br><br>" Another study assessing the impact of clinical pharmacist previsit recommendations on the management by providers of patients with multiple pain diagnoses who were prescribed >50 morphine milligram equivalents/day showed that the decrease in opioid utilization resulting from pharmacist recommendations was coupled with maintenance of pain scores and increased compliance to guidelines (Cox, Tak, Cochella, Leishman, & Gunning, 2018)." |

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| | | | | "The most common information provided was dosage and adverse effects, but that patients who presented their symptoms were offered more thorough counseling than patients who directly requested a product (Horvat, Koder, & Kos, 2012)."<br><br>"Enhanced Pharmacist-conducted medication review: In addition to recommending changes in medicines, pharmacist-led medicines reviews include an element of patient education and provision of information about treatment and their needs (medical condition, duration of treatment, side effects, and range of available treatment options). Patient adherence, understanding and satisfaction play a large part in successful treatment. The intention was that patients would receive between three and six consultations with the pharmacist over a period of 10–12 weeks. Telephone follow-up was conducted only when it was necessary to confirm the continued effectiveness of treatment and/or adherence. The process involved an initial assessment of the patients' condition and treatment using a pre-defined set of questions. At the consultation the pharmacist explored the medicines being used by the patient, including those prescribed and those purchased over the counter (OTC), plus alternative and complementary therapies. All patients were assessed for safety and suitability for NSAID use based on medical and medication history. The pharmacist and patient discussed the extent to which knee pain was controlled using the current medications. Following the discussion, the pharmacist's options for recommendations were to continue medication, add medication, change medication, discontinue medication or GP referral. Where it was decided that a change in medicines might be needed this was discussed and the pharmacist made a recommendation of appropriate pharmacological management within a defined algorithm. The pharmacist also discussed relevant self-help measures that the patient could take, reinforcing those in the information leaflet. The key messages centered around information and reassurance about the condition, modifications of lifestyle, appropriate exercise and the importance of prioritizing daily activities to balance activity and rest. At subsequent consultations, the pharmacist conducted follow-up assessments in which treatment effectiveness and incidence of adverse and side effects to treatment were monitored.<br><br>"Pharmacist-led medicine review significantly improved pain control scores (but not function scores) more than a control intervention at 3 months. Some improvement was sustained over time but at 12 months the difference was not significantly different. The initial consultation with the pharmacist revealed scope for improvement in pain control and reduction in side effects in many patients." |

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| | | | | "In half of the patients for whom an NSAID was being prescribed at the initial assessment the pharmacist recommended discontinuation as a result of the review, and this was implemented."<br><br>"Ways by which the pharmacist can take a frontline approach to oral disease prevention, identification, assessment, management, and referral. These include promoting topical fluorides, especially fluoride toothpaste; promoting the use of rounded-ended soft-bristle toothbrushes; encouraging effective oral hygiene practices; promoting healthy eating; encouraging the use of dental services and preventive therapies; and giving parents and other family caregivers information, motivation, confidence, and the skills to prevent oral disease."<br><br>"Oral counseling and written information in the form of a book on back pain or a drug leaflet, route of administration, frequency, and dose of the medication to be taken, purpose of the medications, contraindications, side-effects, cause of pain, etc."<br><br>"Pharmacists that counseled on the duration of therapy recommended that the patient stop taking the medication when there was no more pain."<br><br>"85/100 pharmacists asked at least one question before recommending a treatment. The most frequent question asked was the medical history of the patient (e.g. chronic health problems such as diabetes, hypertension, or gastric problems) which was asked by 60 pharmacists (56 without being prompted). Questions such as whether the patient had had this problem before and whether he had other symptoms (such as difficulty in urinating) were less frequently asked.<br>- Counselling elements addressed (Not enough effort on patient counseling): Almost all the pharmacists consulted (99%) provided some form of counseling."<br><br>"The other 97 pharmacists only provided verbal counseling to the 'customer'."<br><br>"None of the pharmacists asked the 'customer' whether she understood or needed further information on the treatment recommended."<br><br>"The most frequent counseling point addressed by the pharmacists was the route of administration, followed by the frequency and dose of the medication to be taken (none counseled on n food/drug interactions, mechanisms of action of the medication, and its storage conditions)." |

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| | | | | "In addition to usual care provided by the pharmacy, participants received verbal reinforcement of the pamphlet's content from a trained pharmacy staff member."<br><br>"If the consumer's LBP was acute, pharmacists reinforced the specific messages targeting self-management for acute LBP."<br><br>"Consumers may require more targeted and specific messages and additional components of care in order to improve their general and physical activity-related beliefs and to improve their function and reduce disability."<br><br>"Educational interventions by pharma-cists were not effective in moderating pain intensity and interference with daily life for consumers with persistent LBP, but were effective for consumers with subacute LBP provided the educational interventions were intense (2.5 hours)."<br><br>"Pharmacists can support patient and provider education and promote appropriate prescribing of opioids."<br><br>" Analgesic medication to relieve oral-related and advice."<br><br>"With regard to providing advice about drug-related adverse oral events, over 80% of pharmacists agreed or strongly agreed being confident in dealing with patient enquires."<br><br>" 1. Patient Requests for Combination Analgesics Containing Codeine–to guide pharmacists in the decision-making process regarding the appropriateness of CACC and counselling advice to provide with the product." |
| | | Health Promotional Activities<br>to Enhance Patient's Knowledge of their Acute Pain Condition & Adequate Acute Pain Management Strategies and Awareness of Community Pharmacist Role (e.g. campaigns, leaflets, posters, pamphlets, blogs, etc.) | Written Material Including Educational Booklet or Pamphlet<br>(e.g., leaflet, brochures, etc.) Addressing Patients Particular Acute Condition and Acute Pain Management Recommendations | "These include promoting topical fluorides, especially fluoride toothpaste; promoting the use of rounded-ended soft-bristle toothbrushes; encouraging effective oral hygiene practices; promoting healthy eating; encouraging the use of dental services and preventive therapies; and giving parents and other family caregivers information, motivation, confidence, and the skills to prevent oral disease."<br><br>"Pharmacists generally wish to play a more active role in health promotion. (Participate in oral health promotion activities) -> Their expectations by way of such support are the provision material such as relevant information leaflets, pamphlets, posters, etc.; this is not financially demanding."<br><br>"The benefits of a mass media campaign that provided similar evidence-based messages at a population level, is evidenced by the significant improvements in both community and physician beliefs and the associated decline in number of workers' |

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| | | | | compensation back claims and health utilization over the duration of, and sustained at 3 years beyond, the campaign.<br>The pharmacist also discussed relevant self-help measures that the patient could take, reinforcing those in the information leaflet. The key messages centered around information and reassurance about the condition, modifications of lifestyle, appropriate exercise and the importance of prioritizing daily activities to balance activity and rest."<br><br>"The pharmacist showed the researcher a book on back pain to help her understand the anatomy of the back, and the importance of proper posture and back exercises to strengthen the back."<br><br>"Pamphlet + Education intervention: - Pamphlet: The pamphlet provided evidence-based information about management for LBP (consistent with current recommendations) by highlighting key messages for consumers, such as a need to stay active, stay positive, and stay engaged (for example, at work and socially). " |
| | | Electronic Tools<br>(e.g. interactive online tools, video-based teaching program, etc.) for Patient Education Regarding Their Acute Pain Condition & Management | | "The effectiveness of video-based teaching programme on patient attitude towards pain and satisfaction regarding acute pain management had been reported in adult patients scheduled for a surgical procedure. - while multimedia education about medications is expected to be more effective than no education in improving knowledge and skill acquisition, it must most likely be considered as an adjunct to usual care rather than a replacement for written education or education by a health professional (Ciciriello et al., 2013)."<br><br>"OTC combined analgesics containing codeine (CACC) medications managed by two interactive online clinical tools. Two interactive online clinical tools to aid management of patients who presented requesting OTCCACC were developed."<br><br>"1. Patient Requests for Combination Analgesics Containing Codeine–to guide pharmacists in the decision-making process regarding the appropriateness of CACC and counselling advice to provide with the product. 2. Combination Analgesics Containing Codeine Dependence–to help pharmacists identify CACC dependence, initiate a patient discussion and provide advice/referrals. To increase uptake and utilization of the tool by pharmacists a continuing professional development (CPD) package was developed."<br><br>"A real-time recording and monitoring system for OTC CACC called MedsASSIS: online clinical tool to aid recommendations and management of OTC CACC in Australia CPD Quiz." |
| | | Educational Questionnaire | | "Two groups from the public were interviewed regarding medications using a checklist for questions and colored illustrations. Information was sought on the experience of |

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| | | Assessment & Screening of Patient's Knowledge of their Acute Pain Condition & Current Community Pharmacist-led Practices of Acute Pain Management | | toothache, from whom advice was obtained, user choice of analgesic and its effectiveness, the influence of any medical problem on analgesic choice, the influence of cost of analgesics and claimed dental attendance."<br><br>"For this study, it was hypothesized that 15% of health professionals/patients would currently report a preference for ibuprofen."<br><br>"Questionnaire study on LBP was asked to be submitted by community pharmacists to the patients visiting their pharmacy. The questionnaire included a pain intensity scale, and two validated tools: the Roland and MorrisDisability Questionnaire (RMDQ) and the Start Back Screening Tool (SBST) to determine the degree and risk of patient disability, respectively."<br><br>"The intervention included a validated knee OA (Osteoarthritis) screening questionnaire, education, pain medication management, physiotherapy-guided exercise, and communication with the primary care physician."<br><br>" Questionnaires were given to pharmacists attending continuing education workshops (on back pain treatment including pain advice, OTC advice, etc.)" |
| | Disease Management Programs or Services (Pharmacist-Patient intervention)<br>to Provide an Adequate Management of the Acute Condition | | | "A disease state management (DSM) program for acute LBP management with repeated, regular follow-ups over a 3mo period (1and/or 2 weeks from the initial visit and again 1, 2, and 3 months). This will include either a referral to the doctor or the provision of simple analgesic, advice to stay active and avoid prolonged periods of bed rest, and reassurance of a favourable outcome."<br><br>"Pharmacists felt that implementing a low back pain management (DSM) service (e.g., regular follow-ups to make sure patient is compliant with pain medication) would be very beneficial for patients and ultimately it would save long-term damage and costs associated with low back pain."<br><br>"The disease state management program proposal for acute LBP will have the patients with LBP present at the pharmacy where they will be initially screened by the pharmacist (or qualified pharmacy staff) and then invited to enroll in the DSM program with their consent for follow up. Then clinical information will be gathered including the location of pain, duration of pain, pain severity, pain sensation, other symptoms/medical conditions/allergy, taking any medications? (Including conventional, herbal, or complementary/alternative medicines; regular or 'when required' dosing), and medical history. Any suspected red-flag conditions will be immediately sent with a referral to a physician. If the prognosis is non-specific low back |

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| | | | | pain, then there will be a provision of simple analgesic, advice to stay active, and reassurance of a favorable outcome. Follow up of patient in 1–2 weeks (if consent given) to allow monitoring of condition (improvement or not)."<br><br>"Minor Ailment Service Intervention: To evaluate the impact of an enhanced service compared with current practice. They evaluated four features in this intervention: 1. Standardised consultation for pharmacist-patient intervention where patients received structured face-to-face consultation on presentation to the pharmacy. Pharmacist steps included service offering (explaining the features of the service), clinical assessment (eliciting relevant clinical information and checking for referral symptoms), standardized management (using agreed clinical pathways to proceed with a standardized management approach including provision of self-care advice, non-prescription medicine(s) if appropriate and/or referral to an appropriate health care provider), and documentation and follow-up plan (documenting the consultation in the study data collection form, patient completing the EuroQoL EQ-5D visual analogue scale (VAS) assessment and a direct message was sent to patients' GP of the consultation outcome with patients consent using HealthLink). 2. Use of Integrated technology platforms agreed with GPs such as HealthPathways (protocolized evidence-based clinical care pathways specific to each ailment. The clinical pathways for each ailment were used by community pharmacists to guide consultation with their patients. Each pathway had the same structure and included assessment and management specific to each ailment) and HealthLink (a direct secure messaging system allowing for bidirectional communication between the community pharmacist and the GP). 3. Educational training program for pharmacists: Pharmacists delivering MAS were trained for 7.5 hours by researchers and GPs. Training aimed to ensure pharmacists' competency in delivering the service, clinical areas, consultation skills, red flag and other referral criteria, documentation, and technology systems. The workshop involved a combination of mate-rial, lectures and interactive sessions. 4. Practice change support for pharmacists: Pharmacists delivering MAS were provided 1-hour monthly visits at the pharmacy consisting of support and on-site training by a practice change facilitator (PCF). The PCF monitored data quality, recruitment and intervention fidelity. PCFs were trained to ensure these objectives were met. PCFs also addressed barriers to change using evidence-based strategies and collected both quantitative and qualitative data."<br><br>"Appropriate non-prescription medicine recommendation rate: - Patients receiving MAS were 1.2 times more likely to receive an appropriate non-prescription medicine recommendation by their pharmacist than patients receiving UC. Pharmacists delivering UC |

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| | | | | supplied at least one non-prescription medicine to 95% of patients (n=350), compared with 84% (n=441) delivering MAS (p=0.10)."<br><br>"Pharmacists delivering MAS provided self-care without the supply of a non-prescription medicine to 11% of patients (n=56), compared with 4% (n=15) receiving UC. Patients in the UC arm (35%; n=129) were much more likely to be supplied a medicine without self-care advice, compared with MAS (2%, n=12)."<br><br>"Clinical product-based intervention rate: - Pharmacists delivering MAS performed a clinical product-based intervention for 21% (n=29) of patients requesting a medicine or self-selecting a medicine to treat their symptoms, compared with 11% int he UC group (n=18). The reasons for recommending a change in the patients medication therapy in the MAS group included: (1) a more effective medicine was available (41%; n=12), (2) the patient was self-medicating incorrectly or inappropriately (24%; n=7), (3) the patient had contraindications to the requested medicine (17%; n=5), (4) drug duplication was identified (7%; n=2), (5) the patient requested an inappropriate dosage form (7%; n=2) or (6) toxicity or an adverse effect was present (4%; n=1). Referral Rate: - Referral was provided to 20% (n=104) of patients receiving MAS, compared with 5% (n=19) in the UC arm. 94% of MAS referrals were considered appropriate meeting the agreed clinical protocols compared with 74% in the UC arm. So, patients receiving MAS were 1.5 times more likely to receive an appropriate referral, compared with patients receiving UC. The reasons for referral for these patients included: the patient had marked lethargy or shortness of breath (n=2), trouble breathing or feeling faint (n=1), severe or disabling pain (n=3), fever or neck stiffness (n=2)."<br><br>"Enhanced pharmacy review (pharmacological management in accordance with an algorithm) ->The aims of this intervention were to optimise pharmacological pain control and to reinforce self-help messages contained in the advice leaflet. An experienced community pharmacist (MP) provided this service with access to patients' medical records; it was modeled on the "dependent prescriber" role. MP used a pre-defined set of questions to do an initial assessment of the participants' pain control and drugs. He used standard risk factors to assess the participant's risk of adverse events from non-steroidal anti-inflammatory drugs. He changed participants' drugs according to a pre-defined algorithm, taking into account their preferences, adherence, and potential drug interactions. The protocol permitted three to six sessions of approximately 20 minutes' duration over a 10-week period. In follow-up visits, MP monitored the effectiveness and acceptability of drugs and recommended changes as necessary. This could optimize the drug management of knee pain and provide simple self-help messages. Refer to Pharmacy Algorithm for step-by-step instructions." |

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| | | | | "A 70% increase in the prescribing of simple and com-pound analgesics occurred and a 52% reduction in the prescribing of non-steroidal anti-inflammatory drugs; 104 (99%) participants received advice reinforcing the advice leaflet."<br><br>"Statistically significant improvements in pain scores occurred in participants allocated to enhanced pharmacy review or community physiotherapy with controls. These differences were not sustained to six or 12 months. A substantially and statistically significantly higher proportion of the pharmacy group (33%) than the control group (19%) were classified as responders at three months. - One consistent finding, with important clinical implications, was that prescribing of non-steroidal anti-inflammatory drugs was reduced in both pharmacy and physiotherapy groups compared with control. At six months, use of non-steroidal anti-inflammatory drugs was 16% lower in the pharmacy group and 15% lower in the physiotherapy group than in the control group, with no increase in reporting of pain and high levels of patient satisfaction. This has important safety implications. Non-steroidal anti-inflammatory drugs are the most common cause of iatrogenic disease and are not recommended for long term use, particularly in elderly people, in whom the risk of complications is high. Recalled consultation with general practitioners for knee pain was significantly lower in the six-month period after the physiotherapy intervention than after the control intervention. - Our trial shows that evidence-based care for adults over 55 with knee pain, delivered by primary care pharmacists, results in short term improvements in health outcome, reduction in use of non-steroidal anti-inflammatory drugs, and high patient satisfaction." |
| | Over-The-Counter Analgesics (OTCs) | | | "Pharmacological recommendations: paracetamol, followed by over-the-counter NSAIDS (diclofenac would be the most likely choice, followed by ibuprofen) and topical rubefacients."<br><br>"Current guidelines recommend regular use of paracetamol (4/g daily in divided doses), although the benefits of this regimen are largely unclear. The majority (>66 %) indicated they usually recommend paracetamol."<br><br>"A lot of patients already take regular paracetamol for pain relief. If it did not work, they needed some stronger pain relief such as ones with codeine or anti-inflammatories or even heat patches or rubs. You have products like Panadeine, Mersyndol [combination medicines containing codeine±doxylaminesuccinate] which have become widely accepted as a very strong pain reliever over the counter. This makes it difficult to offer something less effective in their opinion. CPs believe we need to change their way of thinking about pain relief." |

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| | | | | “The PACE trial demonstrated that paracetamol is ineffective for acute low back pain. Interestingly findings from the PACE study have shown that paracetamol (‘‘when required’’ or regular dosing) has no benefit over placebo for acute LBP, whereas evidence around NSAIDs (diclofenac and ibuprofen) and combination medicines containing opioids are limited or lacking. The transfer of such findings to the broader community may help to shape public perception around paracetamol and inform patient decision-making.”<br><br>“ All pharmacists identified paracetamol (paracetamol needs to be regularly taken at the maximum therapeutic dose of 4g daily in divided doses) as the first-line drug choice for the treatment of acute non-specific LBP.”<br><br>“ *Pain Medicines:<br>- Recommendation of a simple analgesic (acetaminophen or NSAID)<br>- Recommendation of more complex pain medicine (combination medicine containing opioid analgesic)”<br><br>“Combination of paracetamol with various NSAIDs to produce better pain relief. But, some vendors have concerns with inadvertent paracetamol overdose by patients. leading to potentially serious adverse events.”<br><br>“NSAIDs: Diclofenac and Ibuprofen alone or in combination.”<br><br>“ Majority of the drugs recommended were oral analgesics and contained NSAIDs either alone or in combination with other agents, the only exception was chlorzoxazone which is a skeletal muscle relaxant although it was combined with paracetamol. - Diclofenac was the most often recommended analgesic in patient medicine stores (59.8%) compared to ibuprofen in 40% of pharmacies.”<br><br>“Transdermal local anesthetics such as lidocaine (gel): Lidocaine normally blocks the initiation and conduction of nerve impulses by decreasing the ionic flux through the neuronal membrane. Gabapentin, an amino acid usually given orally as a treatment for seizures, is effective in reducing pain at rest and pain related to movement (its addition to an opioid regiment allows reduction of opioid use). Compounded transdermal gel containing gabapentin 6%, amitriptyline 2%, and lidocaine 5%.<br>- Comparator: Lidocaine 5% patches (Lidoderm 5%)”<br><br>“Choice of OTC analgesic: Use of aspirin at the beginning of the 1970s to paracetamol, and paracetamol and codeine in the 1980s and early 1990s. Ibuprofen became available as an OTC |

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| | | | | medication in 1983 but in the mid-1990s was chosen as the preferred analgesic."<br><br>" Current evidence suggests that a non-steroidal anti-inflammatory analgesic drug (NSAID) such as aspirin or ibuprofen is more effective at relieving pain of inflammatory origin, such as toothache, than paracetamol or paracetamol and codeine (Cooper et al, 1989)<br>- Dionne and Gordon, 1994; Duxbury, 1998). A review by Rainsford et al (1997) found Ibuprofen to have a similar safety profile to that of paracetamol (paracetamol being safer than aspirin) when used as an OTC preparation for less than seven days.<br>- Both dentists and pharmacists did not disagree significantly on always or regularly advising ibuprofen as the main agent of choice, especially in preference to aspirin or aspirin and codeine. Significant disagreement on whether paracetamol or paracetamol and codeine should provide for a further or second preference. Pharmacists preferred paracetamol and codeine."<br><br>"Clove oil, a constituent of proprietary formulation toothache drops, was recommended 'sometimes' or 'often' by 61.8% of pharmacists."<br><br>" Q: An analgesic for toothache? A: Ibuprofen was ranked as the first choice by 73.6% of pharmacists in contrast to aspirin which was ranked fifth (36.8% pharmacists ). No pharmacists placed aspirin as a first-choice agent. Aspirin, and paracetamol, and codeine were the main analgesics of the second choice, with pharmacists a preference for paracetamol and codeine."<br><br>" Oral therapy (NSAIDs specifically diclofenac or NSAIDs in combination with other medications) "<br><br>"If drug therapy is desired, NSAIDs or skeletal muscle relaxants must be chosen as the first line."<br><br>"Evidence suggests that pain relief does not differ between traditional OTC NSAIDs and prescription NSAIDs"<br><br>" Most of the patients were prescribed oral therapy for low back pain (58 %)"<br><br>" NSAIDs were the most prescribed medication (42%), where diclofenac 50 mg was the most prescribed NSAID. Among the combinations, diclofenac with vitamin B12 was the most prescribed."<br><br>" 96.5 % agreed that pharmacists are a useful source of advice on medicines for low back pain." |

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| | | | | “ The oral dosage form was the most prescribed dosage form with NSAIDs being the most often prescribed medication.”<br><br>“ Some reliable clusters of therapeutic modalities after initial principal component analyses about "benefit" of the modality includes Cluster 1 (Anti-inflammatory drugs, steroid joint injections, paracetamol, steroid treatment, physiotherapy, and anti-depressants).”<br><br>“ For community pharmacists (along with GPs and physiotherapists but pharmacists had the highest score of +0.91 for Cluster 1 for perceived benefits), cluster 1 (anti-inflammatory drugs, steroid joint injections, steroid treatment, paracetamol and anti-depressants) therapeutic modalities received the highest score for benefits for neck, shoulder and upper arm pain.”<br><br>“Oral analgesics, including non-steroidal anti-inflammatory drugs, non-opioid analgesics alone or in combination (22%) were also commonly supplied for the symptomatic relief of pain.”<br><br>“Top 3 most-prescribed opioids for acute pain: - Hydromorphone (short-acting) - Morphine (short-acting) - Codeine combined with acetaminophen (short-acting).”<br><br>“ CPs counseled oral and topical products in 8.4% and 33.1%, respectively, for patients with LBP.”<br><br>“ The percentage of oral and topical medicines counseled by the CPs reached 37.3% and45.4% of patients who took medicines without a medical diagnosis.<br>- 44.8% and22.7% of patients with a low degree of disability have taken topical medicines prescribed by a physician and counseled by CPs since the interview, respectively.”<br><br>“The resulting stratification by those who prescribe/counsel pharmacological treatments underlined those topical treatments were more frequently counseled by CPs than oral treatments to patients, regardless of whether they have visited (33.1%) their physician or not (45.4%). - Topical analgesics have been effective in the management of acute musculoskeletal pain, with an incidence of systemic or local adverse events equal to control. Considering their efficacy/safety balance, topical analgesics could be used more frequently for acute LBP events with low/medium pain intensity as stand-alone or combination treatment. On the contrary, oral analgesics (e.g., paracetamol, opioids) and other medicines could be suggested by CPs (i.e., if OTC medicines are available on the market) or prescribed by the physicians for more intense acute and chronic LBP based on the existing guidelines.” |

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| | | | | " Pharmacological interventions were more frequently used by patients than non-pharmaceutical ones, although they were included in the guidelines for the management of both acute and chronic LBP as well."<br><br>"Acetaminophen is the most widely used nonprescription pain medication, presumably because it is effective, is well-tolerated, and has a good safety profile. Non-prescription products with acetaminophen as the sole medicinal ingredient account for 35% of sales of analgesics; if acetaminophen-codeine combination products are also considered, acetaminophen sales reach 51%"<br><br>" General Guide to Analgesic use - Take a thorhough history: • Look for underlying disease (especially gastrointestinal, renal, hepatic, and cardiovascular disease) • Ask about prescription and OTC drugs • Look for Helicobacter pylori infection • Ask patients about use of alcohol and alternative therapies • Consider using a waiting-room questionnaire to elicit sensitive information (eg, use of alternative medications) - Use the lowest dose of the safest analgesic: • Prescribe acetaminophen, if appropriate • Avoid inappropriate use of NSAIDs by considering whether an anti-inflammatory drug is really needed - Avoid use of multiple NSAIDs and ASA: • Remember that low-dose ASA counts as an NSAID • Recognize patients' use of NSAIDs, ASA, or OTC products • If a patient taking ASA for cardioprotection requires an NSAID, consider using a cyclooxygenase-2 inhibitor instead of a traditional NSAID • If NSAID-ASA cotherapy is essential, give the ASA 1 hour before the NSAID to avoid negating the cardiovascular benefit of the ASA."<br><br>" Currently, evidence-based guidelines for OA also emphasize the utility of combined pharmacologic and nonpharmacologic treatment, such as nonprescription analgesics with exercise and weight loss, but many of the most effective interventions are not commonly implemented."<br><br>" The recommendations given to these patients were to visit a dentist and they were supplied with short-term pain relief."<br><br>"100% provided short-term pain relief."<br><br>"Treatment options for Musculoskeletal pain (Paracetamol, ibuprofen, diclofenac, aspirin, Paracetamol/ibuprofen, ibuprofen gel, diclofenac gel, referral, other/s"<br><br>"It was also generally observed that paracetamol was the preferred choice for most mild to moderatepain scenarios; while anti-inflammatory drugs or 'referral' was preferred for severe pain scenarios.It was also observed that the 'Paracetamol+ibuprofen' combination was generally preferred for more severe cases only. |

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| | | | | Ibuprofen was the medicine of choice for adult mild musculoskeletal pain."<br><br>"'Diclofenac' or 'refer' were the options of choice as severity increases"<br><br>" Overall, 'paracetamol' (72%) was generally preferred as a recommendation over 'ibuprofen'. Results demonstrated that paracetamol and ibuprofen were the two options of choice, with paracetamol generally preferred as a recommendation.<br>- ibuprofen is as safe and effective as paracetamol in many basic analgesic and fever scenarios, in both adult and paediatric populations. Despite this, globally paracetamol is still perceived as having a better safety and overall better tolerability profile than ibuprofen."<br><br>" One study examining non-prescription medicines for pain and fever identified that paracetamol was clearly the recommendation of choice by pharmacy staff, compared to NSAIDs. Also they reported a small proportion of staff recommending NSAIDs when paracetamol was requested by the patient."<br><br>"In a study looking at analgesics recommended by dentists and pharmacists, it was reported that ibuprofen was the OTC analgesic preferred and recommended by majority of both dentists and pharmacists for toothache relief in adults, with paracetamol as the second-choice agent."<br><br>" The current Australian Therapeutic Guidelines suggests paracetamol remains the first-line treatment option for mild acute pain when non-pharmacological treatment strategies are inadequate. As the severity of pain increases, the use of a NSAID may be warranted and the choice of which NSAID is at the healthcare professional's discretion. - In moderate acute pain, clinical guidelines list ibuprofen as the drug of choice because of the widespread experience with its use. - Results from this study identified that diclofenac was the NSAID of choice as the severity of musculoskeletal pain increases in the hypothetical case scenarios. its availability in a specialised oral formulation with a more rapid absorption rate, and the fact that diclofenac has the shortest half-life, could be contributing reasons. recommendations of the clinical guidelines as diclofenac is listed as a second-line therapy (after ibuprofen) for moderate symptoms of pain."<br><br>"guidelines advise health professionals to select a suitable NSAID based on patient comorbidities."<br><br>"Paracetamol - NSAIDs,"<br><br>"Codeine" |

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| | | | | “International LBP management guidelines on paracetamol and non-steroidal anti-inflammatory drugs (NSAIDs) for LBP.”<br><br>“ After non-pharmacological options, a number of current international guidelines suggest the simple analgesic paracetamol to be the first-line treatment for acute and localised non-specific LBP.”<br><br>“ After non-pharmacological options, a number of current international guidelines suggest the simple analgesic paracetamol to be the first-line treatment for acute and localised non-specific LBP. THe pharmacological management aim of paracetamol reduces the severity of pain symptoms via inhibition of prostaglandin synthesis and modulation of inhibitory descending serotonergic pathways -> minimizing the risk of acute cases transforming into chronic cases leading to physical disabilities.”<br><br>“ Much current clinical evidence suggest that targeting LBP with the use of NSAIDs can provide superior and more effective relief of symptoms, especially in comparison to the analgesic effect paracetamol offers.”<br><br>“A number of studies have reported that paracetamol use did not affect recovery time compared with placebo treatment in LBP patient groups. NSAIDs are to be used in as low dosages as possible and for the shortest time possible in order to minimise potential complications due to the fact that NSAIDs carry undesirable adverse effects profiles, potentially causing gastrointestinal ulcerations, renal impairment and cardiovascular complications.”<br><br>“Around 37% of patients were provided with NSAIDs by their medical professional compared to 17% of patients who were given paracetamol for LBP. - Patients who experience LBP symptoms typically respond well to the use of NSAIDs such as ibuprofen, aspirin, and diclofenac.”<br><br>“Clinical pain management guidelines in North America, Asia, Africa and Europe found that many countries actually favour the use of NSAIDs in LBP. Recommending NSAIDs for the management of LBP.”<br><br>“New Zealand clinical guidelines on the management of LBP suggest the use of either paracetamol or the NSAID aspirin as a first-line option, however, these clinical guidelines also suggest that from a therapeutic perspective, all NSAIDs are equally effective and health professionals can recommend whichever NSAID they deem suitable.” |

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| | | | | " Codeine is not recommended as a first-line option for LBP. codeine content in the OTC fixed combinations was subtherapeutic and provided inadequate pain relief."<br><br>" Paracetamol was the drug choice of participants to treat pain symptoms of all severities (mild, moderate and severe) followed by ibuprofen."<br><br>"The simple analgesic paracetamol (mechanism of action complex and not fully understood but suggested it relieves pain through the prostaglandin inhibition pathway) was the most commonly selected treatment option across all three pain severity levels (mild, moderate and severe) followed by ibuprofen. Although paracetamol does not hold the same analgesic potential as NSAIDs, it is still regarded as a safer long-term option particularly in patients experiencing long-term pain paracetamol remained the most commonly selected choice compared to other clinically superior analgesics such as Non-Steroidal Anti-Inflammatories (NSAIDs) like ibuprofen and diclofenac."<br><br>"In terms of efficacy, ibuprofen was the far superior drug producing significantly better outcomes for patients experiencing acute pain, migraine pain and osteoarthritis pain - while NSAIDs provide more positive health outcomes, they should only be used in patients with no contraindications and for short term treatment only."<br><br>"Close to one-quarter (pharmacists) reported that they do not believe that their analgesic medicines are providing adequate pain relief, even though more than half reported that they take their analgesics regularly."<br><br>"The only available pain-relieving medicines in community pharmacies (without a prescription from an authorised prescriber) are simple analgesics such as paracetamol and limited quantities of the NSAIDs aspirin, ibuprofen, diclofenac, naproxen and mefenamic acid."<br><br>"When pharmacists advised patients complaining about dental pain, it would be to consult a dentist, the dispensed painkiller in 44% of cases and in 13% of cases dispensed an antibiotic."<br><br>"Most common complaints were toothache, mouth ulcers, and mouth malodor. Forty three percent of pharmacists advised patients complaining of dental pain to consult a dentist, dispensed painkiller in 44% of cases, and in 13% of cases dispensed an antibiotic."<br><br>" Patient medication and the pharmacist's treatment recommendations - Ninety-four (89%) patients were taking one or more medicines in the form of prescribed analgesics (64), OTC |

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| | | | | analgesics (18)or both (12). Thirty patients were not taking any prescribed analgesics at baseline. Thirty-six patients (34%) were receiving prescribed NSAIDs, an additional six were using OTC NSAIDs and one was taking both prescribed and OTC NSAIDs.<br>- Overall, prescribing of simple (paracetamol) or compound (paracetamol + opioid) analgesics increased from 40 to 71 patients."<br><br>" At baseline 30 (28%) of the 106 patients were not taking any prescribed medicines, although 19 of these were taking OTC analgesics, mainly paracetamol but also including NSAIDs(two) and topical NSAIDs (one). Following the pharmacist's intervention, 22 of these patients were prescribed simple or compound analgesics and two patients were prescribed medicines outside the algorithm by their GP."<br><br>"11 (22.4%) dispensed antibiotics and painkillers without any referral to a nearby physician or dentist."<br><br>"Types of medications recommended: oral non-selective NSAIDs, selective COX-2 inhibitors (e.g. meloxicam, diclofenac oral/topical, celecoxib, rofecoxib, topical ketoprofen, paracetamol with orphenadrine, ibuprofen, naproxen sodium, topical methyl salicylate, vitamin B complex and mefenamic acid) topical NSAIDs, analgesic with muscle relaxant, vitamin B complex, counterirritant."<br><br>"Pharmacists who recommended oral medications provided significantly more counseling than those who recommended a topical product."<br><br>"The purpose of the medications recommended was to alleviate pain and reduce inflammation(NSAIDs), relax stiff muscles (muscle relaxants), and heal damaged nerves (vitamin B). Most medications were to be taken after meals including the COX-2 inhibitors."<br><br>"The common side-effects of NSAIDs mentioned were gastric problems and possible drug allergies, whereas some muscle relaxants could cause drowsiness. The use of NSAIDs in the elderly warrants extra caution due to the high-risk of cardiovascular and gastrointestinal disease as well as age-related decline in renal function (Paracetamol would be a safer first-line drug for back pain in the elderly). "<br><br>" Current analgesics: • provide over-the-counter (OTC) analgesics and non-steroidal anti-inflammatory drugs (NSAIDs), when it is safe to do so." |

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| | | | | "Non-Narcotic analgesics: NSAIDs, acetaminophen, local anesthetic techniques preferentially before opioids (only for severe pain)."<br><br>"Non-opioid analgesics may be more effective for post-extraction pain + dental prescribing can reduce opioid use nationally."<br><br>" products containing codeine, oxycodone, or hydrocodone on the medication list, with the use of both brand and generic name searches."<br><br>" NSAIDs are often appropriate first-line measures for treating dental pain. The use of anti-inflammatory agents in place of opioids is one strategy for reducing opioid use."<br><br>"ADA recommends the use of NSAID analgesics and acetaminophen as "the most effective and most useful analgesic agents" in managing inflammatory pain in the dental setting. The guideline also provides a stepwise algorithm for managing acute pain that reserves opioids for severe pain during the first 24-48 hours only and discusses strategies for avoiding opioid use in patients with a history of substance abuse disorder."<br><br>" The most frequently prescribed opioid was hydrocodone-APAP (56, 55%), followed by codeine-APAP(25, 25%), hydrocodone-ibuprofen (14, 14%), and oxycodone-APAP (7, 7%)."Extraction" was the most common appointment reason when an opioid was prescribed -> tooth extraction was the most common indication for dentist-prescribed opioids. Combinations of APAP and NSAIDs have been proven to be effective for extraction pain in place of opioid medications -> As such, restraint in the prescribing of opioids for extractions has the potential to greatly reduce the number of opioid prescriptions from dental providers."<br><br>" Over 90% of pharmacists agreed or strongly agreed they were confident in handling patient enquiries related to analgesic medication to relieve oral-related pain (95.8%; 138/144), mouth ulcers (95.1%), oral thrush (94.4%), toothache (93.8%)."<br><br>"A topical analgesic was the most commonly dispensed first-line treatment, both on its own or together with an oral analgesic, usually a combination product. Topical non-steroidal anti-inflammatory drugs classified as non-prescription items were the most frequently dispensed agents of all."<br><br>"A topical analgesic was the most commonly dispensed first-line treatment, both on its own or together with an oral analgesic, usually a combination product." |

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| | | | | " Codeine is a weak opioid analgesic used to treat mild-to-moderate pain. In Australia, codeine was available over-the-counter (OTC) until February 2018 in combination with analgesics including paracetamol, ibuprofen and aspirin." |
| | | | Opioid Analgesics | "Pharmacological recommendations: paracetamol, followed by over-the-counter NSAIDS (diclofenac would be the most likely choice, followed by ibuprofen) and topical rubefacients."<br><br>"If it did not work, they needed some stronger pain relief such as ones with codeine or anti-inflammatories or even heat patches or rubs. You have products like Panadeine, Mersyndol [combination medicines containing codeine±doxylaminesuccinate] which have become widely accepted as a very strong pain reliever over the counter. This makes it difficult to offer something less effective in their opinion. CPs believe we need to change their way of thinking about pain relief."<br><br>" Recommendation of more complex pain medicine (combination medicine containing opioid analgesic)."<br><br>"Pharmacists preferred paracetamol and codeine."<br><br>" Aspirin, and paracetamol, and codeine were the main analgesics of the second choice, with pharmacists a preference for paracetamol and codeine."<br><br>" Top 3 most-prescribed opioids for acute pain: - Hydromorphone (short-acting) - Morphine (short-acting) - Codeine combined with acetaminophen (short-acting)."<br><br>"On the contrary, oral analgesics (e.g., paracetamol, opioids) and other medicines could be suggested by CPs (i.e., if OTC medicines are available on the market) or prescribed by the physicians for more intense acute and chronic LBP based on the existing guidelines."<br><br>"- Codeine"<br><br>" codeine is not recommended as a first-line option for LBP. codeine content in the OTC fixed combinations was subtherapeutic and provided inadequate pain relief."<br><br>" Another study assessing the impact of clinical pharmacist previsit recommendations on the management by providers of patients with multiple pain diagnoses who were prescribed >50 morphine milligram equivalents/day showed that the decrease in opioid utilization resulting from pharmacist recommendations was coupled with maintenance of pain scores and increased compliance to guidelines (Cox, Tak, Cochella, Leishman, & Gunning, 2018)." |

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| | | | | " Overall, prescribing of simple (paracetamol) or compound (paracetamol + opioid) analgesics increased from 40 to 71 patients."<br><br>" products containing codeine, oxycodone, or hydrocodone on the medication list, with the use of both brand and generic name searches"<br><br>" The most frequently prescribed opioid was hydrocodone-APAP (56, 55%), followed by codeine-APAP(25, 25%), hydrocodone-ibuprofen (14, 14%), and oxycodone-APAP (7, 7%)."Extraction" was the most common appointment reason when an opioid was prescribed -> tooth extraction was the most common indication for dentist-prescribed opioids."<br><br>" Combinations of APAP and NSAIDs have been proven to be effective for extraction pain in place of opioid medications -> As such, restraint in the prescribing of opioids for extractions has the potential to greatly reduce the number of opioid prescriptions from dental providers."<br><br>" Over 90% of pharmacists agreed or strongly agreed they were confident in handling patient enquiries related to analgesic medication to relieve oral-related pain (95.8%; 138/144), mouth ulcers (95.1%), oral thrush (94.4%), toothache (93.8%) and smoking cessation (91.7%)"<br><br>" Codeine is a weak opioid analgesic used to treat mild-to-moderate pain. In Australia, codeine was available over-the-counter (OTC) until February 2018 in combination with analgesics including paracetamol, ibuprofen and aspirin." |
| | | | Non-Opioids | " Pharmacological recommendations: paracetamol, followed by over-the-counter NSAIDS (diclofenac would be the most likely choice, followed by ibuprofen) and topical rubefacients."<br><br>" Current guidelines recommend regular use of paracetamol (4/g daily in divided doses), although the benefits of this regimen are largely unclear. The majority (>66 %) indicated they usually recommend paracetamol."<br><br>" A lot of patients already take regular paracetamol for pain relief."<br><br>"The PACE trial demonstrated that paracetamol is ineffective for acute low back pain. Interestingly findings from the PACE study have shown that paracetamol (''when required'' or regular dosing) has no benefit over placebo for acute LBP, whereas evidence around NSAIDs (diclofenac and ibuprofen) and combination medicines containing opioids are limited or lacking. The transfer of such findings to the broader community may help to shape public |

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| | | | | perception around paracetamol and inform patient decision-making”<br><br>“All pharmacists identified paracetamol (paracetamol needs to be regularly taken at the maximum therapeutic dose of 4g daily in divided doses) as the first-line drug choice for the treatment of acute non-specific LBP.”<br><br>“*Pain Medicines:<br>- Recommendation of a simple analgesic (acetaminophen or NSAID)”<br><br>“ Combination of paracetamol with various NSAIDs to produce better pain relief. But, some vendors have concerns with inadvertent paracetamol overdose by patients. leading to potentially serious adverse events.”<br><br>“ NSAIDs: Diclofenac and Ibuprofen alone or in combination.”<br><br>“Majority of the drugs recommended were oral analgesics and contained NSAIDs either alone or in combination with other agents, the only exception was chlorzoxazone which is a skeletal muscle relaxant although it was combined with paracetamol.”<br><br>“ Diclofenac was the most often recommended analgesic in patient medicine stores (59.8%) compared to ibuprofen in 40% of pharmacies.”<br><br>“For the back pain scenario, the most common medications dispensed were oral analgesics and contained non-steroidal anti-inflammatory drugs (NSAIDs) alone and/or in combination with paracetamol. Ibuprofen alone or in combination with paracetamol was the most commonly dispensed analgesics. Combining paracetamol with various NSAIDs has been shown to produce better pain relief and control, a major fear is unintentional paracetamol overdoses and toxicity by patients, predisposing to potentially deleterious outcomes.”<br><br>“ Choice of OTC analgesic: Use of aspirin at the beginning of the 1970s to paracetamol, and paracetamol and codeine in the 1980s and early 1990s. Ibuprofen became available as an OTC medication in 1983 but in the mid-1990s was chosen as the preferred analgesic.”<br><br>“ Current evidence suggests that a non-steroidal anti-inflammatory analgesic drug (NSAID) such as aspirin or ibuprofen is more effective at relieving pain of inflammatory origin, such as toothache, than paracetamol or paracetamol and codeine (Cooper et al, 1989).” |

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| | | | | "Oral analgesics, including non-steroidal anti-inflammatory drugs, non-opioid analgesics alone or in combination (22%) were also commonly supplied for the symptomatic relief of pain."<br><br>"On the contrary, oral analgesics (e.g., paracetamol, opioids) and other medicines could be suggested by CPs (i.e., if OTC medicines are available on the market) or prescribed by the physicians for more intense acute and chronic LBP based on the existing guidelines."<br><br>"- Acetaminophen is the most widely used nonprescription pain medication, presumably because it is effective, is well-tolerated, and has a good safety profile. Non-prescription products with acetaminophen as the sole medicinal ingredient account for 35% of sales of analgesics; if acetaminophen-codeine combination products are also considered, acetaminophen sales reach 51%."<br><br>"- Use the lowest dose of the safest analgesic: • Prescribe acetaminophen, if appropriate • Avoid inappropriate use of NSAIDs by considering whether an anti-inflammatory drug is really needed - Avoid use of multiple NSAIDs and ASA: • Remember that low-dose ASA counts as an NSAID • Recognize patients' use of NSAIDs, ASA, or OTC products • If a patient taking ASA for cardioprotection requires an NSAID, consider using a cyclooxygenase-2 inhibitor instead of a traditional NSAID • If NSAID-ASA cotherapy is essential, give the ASA 1 hour before the NSAID to avoid negating the cardiovascular benefit of the ASA"<br><br>" The recommendations given to these patients were to visit a dentist and they were supplied with short-term pain relief."<br><br>"Treatment options for Musculoskeletal pain (Paracetamol, ibuprofen, diclofenac, aspirin, Paracetamol/ibuprofen, ibuprofen gel, diclofenac gel, referral, other/s."<br><br>"It was also generally observed that paracetamol was the preferred choice for most mild to moderatepain scenarios; while anti-inflammatory drugs or 'referral' was preferred for severe pain scenarios.It was also observed that the 'Paracetamol+ibuprofen' combination was generally preferred for more severe cases only. Ibuprofen was the medicine of choice for adult mild musculoskeletal pain."<br><br>"'Diclofenac' or 'refer' were the options of choice as severity increases"<br><br>" Overall, 'paracetamol' (72%) was generally preferred as a recommendation over 'ibuprofen'. Results demonstrated that paracetamol and ibuprofen were the two options of choice, with paracetamol generally preferred as a recommendation." |

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| | | | | " ibuprofen is as safe and effective as paracetamol in many basic analgesic and fever scenarios, in both adult and paediatric populations. Despite this, globally paracetamol is still perceived as having a better safety and overall better tolerability profile than ibuprofen."<br><br>"One study examining non-prescription medicines for pain and fever identified that paracetamol was clearly the recommendation of choice by pharmacy staff, compared to NSAIDs. Also they reported a small proportion of staff recommending NSAIDs when paracetamol was requested by the patient."<br><br>"In a study looking at analgesics recommended by dentists and pharmacists, it was reported that ibuprofen was the OTC analgesic preferred and recommended by majority of both dentists and pharmacists for toothache relief in adults, with paracetamol as the second-choice agent."<br><br>" The current Australian Therapeutic Guidelines suggests paracetamol remains the first-line treatment option for mild acute pain when non-pharmacological treatment strategies are inadequate. As the severity of pain increases, the use of a NSAID may be warranted and the choice of which NSAID is at the healthcare professional's discretion. - In moderate acute pain, clinical guidelines list ibuprofen as the drug of choice because of the widespread experience with its use. - Results from this study identified that diclofenac was the NSAID of choice as the severity of musculoskeletal pain increases in the hypothetical case scenarios. its availability in a specialised oral formulation with a more rapid absorption rate, and the fact that diclofenac has the shortest half-life, could be contributing reasons. recommendations of the clinical guidelines as diclofenac is listed as a second-line therapy (after ibuprofen) for moderate symptoms of pain."<br><br>"Guidelines advise health professionals to select a suitable NSAID based on patient comorbidities."<br><br>" Paracetamol - NSAIDs,"<br><br>" international LBP management guidelines on paracetamol and non-steroidal anti-inflammatory drugs (NSAIDs) for LBP."<br><br>"After non-pharmacological options, a number of current international guidelines suggest the simple analgesic paracetamol to be the first-line treatment for acute and localised non-specific LBP."<br><br>"After non-pharmacological options, a number of current international guidelines suggest the simple analgesic paracetamol |

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| | | | | to be the first-line treatment for acute and localised non-specific LBP. THe pharmacological management aim of paracetamol reduces the severity of pain symptoms via inhibition of prostaglandin synthesis and modulation of inhibitory descending serotonergic pathways -> minimizing the risk of acute cases transforming into chronic cases leading to physical disabilities."<br><br>"Much current clinical evidence suggest that targeting LBP with the use of NSAIDs can provide superior and more effective relief of symptoms, especially in comparison to the analgesic effect paracetamol offers."<br><br>"A number of studies have reported that paracetamol use did not affect recovery time compared with placebo treatment in LBP patient groups. NSAIDs are to be used in as low dosages as possible and for the shortest time possible in order to minimise potential complications due to the fact that NSAIDs carry undesirable adverse effects profiles, potentially causing gastrointestinal ulcerations, renal impairment and cardiovascular complications.<br><br>"Around 37% of patients were provided with NSAIDs by their medical professional compared to 17% of patients who were given paracetamol for LBP. - Patients who experience LBP symptoms typically respond well to the use of NSAIDs such as ibuprofen, aspirin, and diclofenac."<br><br>" Clinical pain management guidelines in North America, Asia, Africaand Europe found that many countries actually favour the use of NSAIDs in LBP. Recommending NSAIDs for the management of LBP."<br><br>"New Zealand clinical guidelines on the management of LBP suggest the use of either paracetamol or the NSAID aspirin as a first-line option, however, these clinical guidelines also suggest that from a therapeutic perspective, all NSAIDs are equally effective and health professionals can recommend whichever NSAID they deem suitable."<br><br>"Paracetamol was the drug choice of participants to treat pain symptoms of all severities (mild, moderate and severe) followed by ibuprofen."<br><br>"The simple analgesic paracetamol (mechanism of action complex and not fully understood but suggested it relieves pain through the prostaglandin inhibition pathway) was the most commonly selected treatment option across all three pain severity levels (mild, moderate and severe) followed by ibuprofen. Although paracetamol does not hold the same analgesic potential as NSAIDs, it is still regarded as a safer long-term option particularly |

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| | | | | in patients experiencing long-term pain paracetamol remained the most commonly selected choice compared to other clinically superior analgesics such as Non-Steroidal Anti-Inflammatories (NSAIDs) like ibuprofen and diclofenac."<br><br>"In terms of efficacy, ibuprofen was the far superior drug producing significantly better outcomes for patients experiencing acute pain, migraine pain and osteoarthritis pain - while NSAIDs provide more positive health outcomes, they should only be used in patients with no contraindications and for short term treatment only."<br><br>" the only available pain-relieving medicines in community pharmacies (without a prescription from an authorised prescriber) are simple analgesics such as paracetamol and limited quantities of the NSAIDs aspirin, ibuprofen, diclofenac, naproxen and mefenamic acid."<br><br>"When pharmacists advised patients complaining about dental pain, it would be to consult a dentist, the dispensed painkiller in 44% of cases and in 13% of cases dispensed an antibiotic."<br><br>" Patient medication and the pharmacist's treatment recommendations - Ninety-four (89%) patients were taking one or more medicines in the form of prescribed analgesics (64), OTC analgesics (18)or both (12). Thirty patients were not taking any prescribed analgesics at baseline. Thirty-six patients (34%) were receiving prescribed NSAIDs, an additional six were using OTC NSAIDs and one was taking both prescribed and OTC NSAIDs."<br><br>"Overall, prescribing of simple (paracetamol) or compound (paracetamol + opioid) analgesics increased from 40 to 71 patients."<br><br>"At baseline 30 (28%) of the 106 patients were not taking any prescribed medicines, although 19 of these were taking OTC analgesics, mainly paracetamol but also including NSAIDs(two) and topical NSAIDs (one). Following the pharmacist's intervention, 22 of these patients were prescribed simple or compound analgesics and two patients were prescribed medicines outside the algorithm by their GP."<br><br>" Pharmacist advice includes referrals to nearby dentists, dispensing medications for short-term pain relief (antibiotics and/or painkillers)."<br><br>"Types of medications recommended: oral non-selective NSAIDs, selective COX-2 inhibitors (e.g. meloxicam, diclofenac oral/topical, celecoxib, rofecoxib, topical ketoprofen, paracetamol with orphenadrine, ibuprofen, naproxen sodium, topical methyl |

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| | | | | salicylate, vitamin B complex and mefenamic acid) topical NSAIDs, analgesic with muscle relaxant, vitamin B complex, counterirritant."<br><br>"The purpose of the medications recommended was to alleviate pain and reduce inflammation(NSAIDs), relax stiff muscles (muscle relaxants), and heal damaged nerves (vitamin B). Most medications were to be taken after meals including the COX-2 inhibitors.:"<br><br>"The common side-effects of NSAIDs mentioned were gastric problems and possible drug allergies, whereas some muscle relaxants could cause drowsiness. The use of NSAIDs in the elderly warrants extra caution due to the high-risk of cardiovascular and gastrointestinal disease as well as age-related decline in renal function (Paracetamol would be a safer first-line drug for back pain in the elderly)."<br><br>" Current analgesics: • provide over-the-counter (OTC) analgesics and non-steroidal anti-inflammatory drugs (NSAIDs), when it is safe to do so."<br><br>" Non-Narcotic analgesics: NSAIDs, acetaminophen, local anesthetic techniques preferentially before opioids (only for severe pain)."<br><br>" non-opioid analgesics may be more effective for post-extraction pain + dental prescribing can reduce opioid use nationally."<br><br>"NSAIDs are often appropriate first-line measures for treating dental pain. The use of anti-inflammatory agents in place of opioids is one strategy for reducing opioid use."<br><br>"ADA recommends the use of NSAID analgesics and acetaminophen as "the most effective and most useful analgesic agents" in managing inflammatory pain in the dental setting. The guideline also provides a stepwise algorithm for managing acute pain that reserves opioids for severe pain during the first 24-48 hours only and discusses strategies for avoiding opioid use in patients with a history of substance abuse disorder."<br><br>"Combinations of APAP and NSAIDs have been proven to be effective for extraction pain in place of opioid medications -> As such, restraint in the prescribing of opioids for extractions has the potential to greatly reduce the number of opioid prescriptions from dental providers."<br><br>"Over 90% of pharmacists agreed or strongly agreed they were confident in handling patient enquiries related to analgesic medication to relieve oral-related pain (95.8%; 138/144), mouth |

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| | | | | ulcers (95.1%), oral thrush (94.4%), toothache (93.8%) and smoking cessation(91.7%)" |
| | | | Combination Therapy for Treatment Regimen (e.g. administering several separate medications for effective acute pain management) | " Pharmacological recommendations: paracetamol, followed by over-the-counter NSAIDS (diclofenac would be the most likely choice, followed by ibuprofen) and topical rubefacients."<br><br>"You have products like Panadeine, Mersyndol [combination medicines containing codeine±doxylaminesuccinate] which have become widely accepted as a very strong pain reliever over the counter. This makes it difficult to offer something less effective in their opinion."<br><br>" Recommendation of more complex pain medicine (combination medicine containing opioid analgesic)."<br><br>"Combination of paracetamol with various NSAIDs to produce better pain relief. But, some vendors have concerns with inadvertent paracetamol overdose by patients. leading to potentially serious adverse events."<br><br>" NSAIDs: Diclofenac and Ibuprofen alone or in combination."<br><br>"Majority of the drugs recommended were oral analgesics and contained NSAIDs either alone or in combination with other agents, the only exception was chlorzoxazone which is a skeletal muscle relaxant although it was combined with paracetamol."<br><br>"For the back pain scenario, the most common medications dispensed were oral analgesics and contained non-steroidal anti-inflammatory drugs (NSAIDs) alone and/or in combination with paracetamol. Ibuprofen alone or in combination with paracetamol was the most commonly dispensed analgesics. Combining paracetamol with various NSAIDs has been shown to produce better pain relief and control, a major fear is unintentional paracetamol overdoses and toxicity by patients, predisposing to potentially deleterious outcomes."<br><br>"Oral therapy (NSAIDs specifically diclofenac or NSAIDs in combination with other medications)"<br><br>"Among the combinations, diclofenac with vitamin B12 was the most prescribed. "<br><br>"- Some reliable clusters of therapeutic modalities after initial principal component analyses about "benefit" of the modality includes Cluster 1 (Anti-inflammatory drugs, steroid joint injections, paracetamol, steroid treatment, physiotherapy, and anti-depressants)<br>- For community pharmacists (along with GPs and physiotherapists but pharmacists had the highest score of +0.91 |

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| | | | | for Cluster 1 for perceived benefits), cluster 1 (anti-inflammatory drugs, steroid joint injections, steroid treatment, paracetamol and anti-depressants) therapeutic modalities received the highest score for benefits for neck, shoulder and upper arm pain."<br><br>"Oral analgesics, including non-steroidal anti-inflammatory drugs, non-opioid analgesics alone or in combination (22%) were also commonly supplied for the symptomatic relief of pain."<br><br>" Top 3 most-prescribed opioids for acute pain: - Hydromorphone (short-acting) - Morphine (short-acting) - Codeine combined with acetaminophen (short-acting)."<br><br>" CPs counseled oral and topical products in 8.4% and 33.1%, respectively, for patients with LBP."<br><br>" Topical analgesics have been effective in the management of acute musculoskeletal pain, with an incidence of systemic or local adverse events equal to control. Considering their efficacy/safety balance, topical analgesics could be used more frequently for acute LBP events with low/medium pain intensity as stand-alone or combination treatment."<br><br>"Non-prescription products with acetaminophen as the sole medicinal ingredient account for 35% of sales of analgesics; if acetaminophen-codeine combination products are also considered, acetaminophen sales reach 51%."<br><br>" If NSAID-ASA cotherapy is essential, give the ASA 1 hour before the NSAID to avoid negating the cardiovascular benefit of the ASA"<br><br>" Currently, evidence-based guidelines for OA also emphasize the utility of combined pharmacologic and nonpharmacologic treatment, such as nonprescription analgesics with exercise and weight loss, but many of the most effective interventions are not commonly implemented."<br><br>"While anti-inflammatory drugs or 'referral' was preferred for severe pain scenarios.It was also observed that the 'Paracetamol+ibuprofen' combination was generally preferred for more severe cases only. Ibuprofen was the medicine of choice for adult mild musculoskeletal pain; 'Diclofenac' or 'refer' were the options of choice as severity increases."<br><br>" The simple analgesic paracetamol (mechanism of action complex and not fully understood but suggested it relieves pain through the prostaglandin inhibition pathway) was the most commonly selected treatment option across all three pain severity levels (mild, moderate and severe) followed by ibuprofen." |

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| | | | | " Patient medication and the pharmacist's treatment recommendations - Ninety-four (89%) patients were taking one or more medicines in the form of prescribed analgesics (64), OTC analgesics (18)or both (12). Thirty patients were not taking any prescribed analgesics at baseline. Thirty-six patients (34%) were receiving prescribed NSAIDs, an additional six were using OTC NSAIDs and one was taking both prescribed and OTC NSAIDs."<br><br>"Overall, prescribing of simple (paracetamol) or compound (paracetamol + opioid) analgesics increased from 40 to 71 patients."<br><br>" At baseline 30 (28%) of the 106 patients were not taking any prescribed medicines, although 19 of these were taking OTC analgesics, mainly paracetamol but also including NSAIDs(two) and topical NSAIDs (one). Following the pharmacist's intervention, 22 of these patients were prescribed simple or compound analgesics and two patients were prescribed medicines outside the algorithm by their GP."<br><br>"Types of medications recommended: oral non-selective NSAIDs, selective COX-2 inhibitors (e.g. meloxicam, diclofenac oral/topical, celecoxib, rofecoxib, topical ketoprofen, paracetamol with orphenadrine, ibuprofen, naproxen sodium, topical methyl salicylate, vitamin B complex and mefenamic acid) topical NSAIDs, analgesic with muscle relaxant, vitamin B complex, counterirritant."<br><br>" The most frequently prescribed opioid was hydrocodone-APAP (56, 55%), followed by codeine-APAP(25, 25%), hydrocodone-ibuprofen (14, 14%), and oxycodone-APAP (7, 7%)."Extraction" was the most common appointment reason when an opioid was prescribed -> tooth extraction was the most common indication for dentist-prescribed opioids. Combinations of APAP and NSAIDs have been proven to be effective for extraction pain in place of opioid medications -> As such, restraint in the prescribing of opioids for extractions has the potential to greatly reduce the number of opioid prescriptions from dental providers."<br><br>"A topical analgesic was the most commonly dispensed first-line treatment, both on its own or together with an oral analgesic, usually a combination product. Topical non-steroidal anti-inflammatory drugs"<br><br>"A topical analgesic was the most commonly dispensed first-line treatment, both on its own or together with an oral analgesic, usually a combination product"<br><br>"OTC combined analgesics containing codeine (CACC) medications managed by two interactive online clinical tools." |

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| | | | | “ Codeine is a weak opioid analgesic used to treat mild-to-moderate pain. In Australia, codeine was available over-the-counter (OTC) until February 2018 in combination with analgesics including paracetamol, ibuprofen and aspirin.” |
| | | | Topical Analgesics | “Transdermal local anesthetics such as lidocaine (gel): Lidocaine normally blocks the initiation and conduction of nerve impulses by decreasing the ionic flux through the neuronal membrane.<br>“Gabapentin, an amino acid usually given orally as a treatment for seizures, is effective in reducing pain at rest and pain related to movement (its addition to an opioid regiment allows reduction of opioid use). Compounded transdermal gel containing gabapentin 6%, amitriptyline 2%, and lidocaine 5%.<br>- Comparator: Lidocaine 5% patches (Lidoderm 5%)”<br><br>“Clove oil, a constituent of proprietary formulation toothache drops, was recommended 'sometimes' or 'often' by 61.8% of pharmacists.”<br><br>“ CPs counseled oral and topical products in 8.4% and 33.1%, respectively, for patients with LBP.”<br><br>“The percentage of oral and topical medicines counseled by the CPs reached 37.3% and45.4% of patients who took medicines without a medical diagnosis.”<br><br>“ 44.8% and22.7% of patients with a low degree of disability have taken topical medicines prescribed by a physician and counseled by CPs since the interview, respectively.”<br><br>“The resulting stratification by those who prescribe/counsel pharmacological treatments underlined those topical treatments were more frequently counseled by CPs than oral treatments to patients, regardless of whether they have visited (33.1%) their physician or not (45.4%). - Topical analgesics have been effective in the management of acute musculoskeletal pain, with an incidence of systemic or local adverse events equal to control. Considering their efficacy/safety balance, topical analgesics could be used more frequently for acute LBP events with low/medium pain intensity as stand-alone or combination treatment.”<br><br>“ Ways by which the pharmacist can take a frontline approach to oral disease prevention, identification, assessment, management, and referral. These include promoting topical fluorides, especially fluoride toothpaste; promoting the use of rounded-ended soft-bristle toothbrushes; encouraging effective oral hygiene practices; promoting healthy eating; encouraging the use of dental services and preventive therapies; and giving parents and other family caregivers information, motivation, confidence, and the skills to prevent oral disease.” |

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| | | | | " A topical analgesic was the most commonly dispensed first-line treatment, both on its own or together with an oral analgesic, usually a combination product. Topical non-steroidal anti-inflammatory drugs classified as non-prescription items were the most frequently dispensed agents of all."<br><br>"A topical analgesic was the most commonly dispensed first-line treatment, both on its own or together with an oral analgesic, usually a combination product." |
| | Recommending Alternative (Non-Pharmacological) Therapies or Self-Care Advice | | | "Common non-pharmacological recommendations: advice to rest, cold application, avoid risks, and maintain physical activity/exercises."<br><br>"More emphasis on appropriate non-pharmacological management strategies such as staying active is required."<br><br>"Non-pharmacological treatment strategies: more pharmacists reported they would advise people with acute LBP to rest compared with engaging in physical activity exposing an area of current practice that conflicts with guideline recommendations. However, pharmacists did provide recommendations for avoiding aggravating factors (e.g. lifting heavy objects), concordant with guideline endorsed recommendations. More pharmacists also reported recommending ice packs compared to heat application"<br><br>"*Self-care advice:<br>- Reassurance of a favorable<br>- Advice to stay active and avoid bed rest<br>- Superficial heat "<br><br>" Non-pharmacological therapies (e.g. exercise/stay active, avoid prolonged bed rest) "<br><br>" 93.3% agreed that patients should avoid all painful movements."<br><br>"98.1 % agreed that they offer good advice about back pain and finally 95.2 % agreed that their support staff offers good advice about back pain."<br><br>"Pharmacist #5: using a heat wrap will also help, and I would say take the Voltaren 2-3 times per day with food."<br><br>" Current clinical practice guidelines for the management of LBP recommend first-line care that includes reassurance, advice to stay active and avoid bed rest, and discouraging diagnostic imaging such as plain radiographs unless serious pathology is suspected."<br><br>" one-third of pharmacists reported they frequently warned or advised patients about addiction risks. Reminding patients about |

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| | | | | safe behaviors with prescription drugs at home appears to be performed with variable frequencies”<br><br>“ CPs can counsel patients on the most appropriate self-medication strategy or support them in following the medical prescription correctly.”<br><br>“CPs were able to implement validated tools for LBP assessment in their daily activities. Pain intensity scales and RMDQ were effective in supporting the CPs in the assessment of the patients’ clinical condition and rationalize their advice on the most OTC treatments.”<br><br>“Non-pharmacological approaches includes therapeutic exercise and stretching, stress management, biofeedback, physical modalities, cognitive-behavioural approaches, and alternative approaches. “<br><br>“oral hygiene advice was given in 41.2% of cases”<br><br>“Non-pharmacological strategies”<br><br>“Clinical guidelines suggest recommending a trial of these non-pharmacological treatments as part of an overall management approach inclusive of patient education and pharmacological therapy.”<br><br>“ According to the current Australian Therapeutic Guidelines, treatment of LBP begins with the implementation of non-pharmacological strategies where appropriate (consistent with other international guidelines). Non-pharmacological treatments: - Conflicts with regards to the use of passive physical therapies such as acupuncture and transcutaneous electrical nerve stimulation (TENS) in LBP cases. - Cases of patients reporting temporary pain relief from thermotherapy and remedial massage. - Clinical guidelines suggest recommending a trial of these non-pharmacological treatents as part of an overall management approach inclusive of patient education and pharmacological therapy.”<br><br>“The NICE guidelines which are adopted in the United Kingdom strongly advise against the use of paracetamol alone, these guidelines highlight that the choice of NSAID is crucial. “<br><br>“The pharmacist also discussed relevant self-help measures that the patient could take, reinforcing those in the information leaflet. The key messages centered around information and reassurance about the condition, modifications of lifestyle, appropriate exercise and the importance of prioritizing daily activities to balance activity and rest.” |

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| | | | | "Pharmacist advice includes referrals to nearby dentists, dispensing medications for short-term pain relief (antibiotics and/or painkillers)."<br><br>" Ways by which the pharmacist can take a frontline approach to oral disease prevention, identification, assessment, management, and referral. These include promoting topical fluorides, especially fluoride toothpaste; promoting the use of rounded-ended soft-bristle toothbrushes; encouraging effective oral hygiene practices; promoting healthy eating; encouraging the use of dental services and preventive therapies; and giving parents and other family caregivers information, motivation, confidence, and the skills to prevent oral disease."<br><br>"The pharmacist showed the researcher a book on back pain to help her understand the anatomy of the back, and the importance of proper posture and back exercises to strengthen the back."<br><br>"- reassure and provide appropriate information and/or advice<br>- advise those with "red flags" to seek medical care Attitudes towards back pain and its treatment" |
| | Referring Patient to Another Healthcare Professional<br>(e.g., Dentist, Emergency Department Imaging, General Practitioner, etc.) | | | "*Referral:<br>- GP or physical therapist<br>- Imaging is indicated<br>- Prompt medical review"<br><br>"Referral to a specialist or imaging is only indicated when there is a suspected fracture or signs and symptoms of a red flag."<br><br>" 46.6% of pharmacists frequently refer people with back pain to their general physician. While only 8.2% have negative feelings about advising people with back pain."<br><br>"Most of the pharmacists (73.10 %) referred low back pain patients that seem to be caused by an underlying serious disease. "<br><br>"Referral Rate: - Referral was provided to 20% (n=104) of patients receiving MAS, compared with |

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| | | | | 5% (n=19) in the UC arm. 94% of MAS referrals were considered appropriate meeting the agreed clinical protocols compared with 74% in the UC arm. So, patients receiving MAS were 1.5 times more likely to receive an appropriate referral, compared with patients receiving UC. The reasons for referral for these patients included: the patient had marked lethargy or shortness of breath (n=2), trouble breathing or feeling faint (n=1), severe or disabling pain (n=3), fever or neck stiffness (n=2), potentially a thunderclap headache with sudden onset (n=2) or monocular pain and red eye with visual disturbance (n=1)."<br><br>"It is also significant to note that although the most common recommendation of the pharmacist is 'to see a dentist'"<br><br>"Recommendations given by the pharmacist for a painful oral health problem: Pharmacists advised the client to see a dentist in 94.1% of cases, to see a doctor in 23.5% of cases."<br><br>"'referral' was preferred for severe pain scenarios."<br><br>"When pharmacists advised patients complaining about dental pain, it would be to consult a dentist, the dispensed painkiller in 44% of cases and in 13% of cases dispensed an antibiotic." |

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| | | | | "One hundred and sixteen(81.7%) pharmacists refer patients requiring dental care to dental professionals."<br><br>"Though 19 (38.8%) of the participating pharmacists ask the patient to consult a nearby dentist after dispensing medications."<br><br>"Twelve (24.5%) pharmacists said that they just ask the patient to consult a nearby dentist, without dispensing drugs."<br><br>"Most of the pharmacists, similar to the latter study, referred the patients to the nearby dentist after dispensing medications for short-term pain relief."<br><br>"it is interesting to note that nearly 22.4% of the pharmacists dispense antibiotics and painkillers and do not refer the patient to a dentist or physician."<br><br>"This is a matter of concern since short-term pain relief might mean that the patient will postpone consulting a dentist or physician and, thereby, an opportunity to diagnose a disease in its early stage may be lost."<br><br>" advise those with "red flags" to seek medical care Attitudes towards back pain and its treatment."<br><br>" Pharmacists also indicated to participants, the 'red flags' conditions specified in the pamphlet, and which required medical review (including severe, constant (24 hours a day) back pain; severe back |

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| | | | | pain with leg pain and weakness or changes in sensation extending into the leg/s; loss of bowel and bladder control; numbness in the genital area or buttocks; fever; a need for continuous pain-relieving medicine for more than a few days). If consumers identified any of these 'red flag' items or were identified as needing help regarding pamphlet items such as 'relaxation strategies' or were feeling anxious, stressed, or depressed', pharmacists were instructed to refer the consumers to their family doctor or health care professional for further advice."<br><br>"Collaboration between pharmacists and dental providers has the potential to reduce opioid utilization in primary dental practice. - In this study, fewer than 0.5% of visits resulted in an opioid order when pharmacy services were partially or fully integrated, compared with 1.8% with no integration. An increased sense of accountability due to the inclusion of another health care professional in the practice environment may have influenced prescribers to become more discerning when choosing to prescribe treatment for pain."<br><br>"2. Combination Analgesics Containing Codeine Dependence–to help pharmacists identify CACC dependence, initiate a patient discussion and provide advice/referrals. To increase uptake and utilization of the tool by pharmacists a continuing professional development (CPD) package was developed." |

| Barriers in Acute Pain Care & Management | | | |
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| **Theme** | **Subtheme** | **Subtheme 2** | **Quotes** |
| Barriers for Community Pharmacists | Lack of financial & institutional support | | "Cost of educational events. Any freely accessible educational events for healthcare professionals are industry-run, with the possibility of content and promotional bias."<br><br>"Lack of support from professional and government bodies to implement clinical tools and programs for LBP management."<br><br>"Limited cost due to cost-cutting measures taken by the manufacturers"<br><br>"The support that has been requested by the pharmacies is not financially demanding, such as relevant oral health leaflets and window displays."<br><br>"The stocks of oral healthcare products in pharmacies were relatively low compared to larger city retailers. - Barriers to health promotion in pharmacies: (i) no liaison with other primary care team members, (ii) lack of space, (iii) lack of finance from health authority and (iv) lack of courses."<br><br>"Limited reports on the exact economic burden associated with inadequate pharmacological LBP management ( less than optimal management can also result in an increased economic burden). An increase in healthcare costs is associated with inadequate pharmacological management of LBP."<br><br>"Limited variability of analgesics available in community pharmacies."<br><br>"Most of the Saudi pharmacists prefer to work in the governmental sectors."<br><br>"Lack of cost"<br><br>"Limitations of scopes of practice, insufficient institutional support in terms of staffing, dedicating time, training or interdisciplinary leadership support (Giannitrapani et al., 2018). appropriate education and training of the pharmacy staffs involve appropriate funding whose amounts and sources remain to be defined." |
| | Lack of knowledge, education, and training) | | "Training may also be extended to the pharmacy staff e.g. pharmacy assistants who are in regular contact with patients."<br><br>"When pharmacists offer patients something with no guarantee of pain relief in the immediate term."<br><br>"Lack of education and training is a common barrier to providing adequate pain management by pharmacists."<br><br>"Lack of LBP interventions to a group of healthcare professionals who commonly encounter LBP and who can make a significant contribution towards its management in primary care."<br><br>"Less is known about pharmacist-led interventions for common musculoskeletal conditions such as non-specific low back pain (LBP)." |

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| | | | “Lack of adequate training, staffing, and monetary reimbursement for delivering a successful low back pain management service.”<br><br>“Provision of inadequate information/counseling to issues around the quality of the recommended drugs (e.g. OTC analgesics recommended by pharmacists for back pain states, advice on possible side effects, dosing instructions, and maximum dose of medicine(s) to be taken daily)”<br><br>“Lack of clinical training and poor community awareness towards the role of community pharmacists in the management of minor ailments (e.g. clinical training are mostly provided to physicians and nurses and very few community pharmacists). To meet the needs of the customers, pharmacist provide drugs for common ailments and if the patient's willingness to pay is less, they will give generic drug with low price as alternative.”<br><br>“Proper training about how to diagnose, how to select medications for common ailments, how to counsel the customers coming with symptoms have a significant impact on their practice (this can decrease medication therapy errors).”<br><br>“The irrational use of analgesics includes the provision of inappropriate dosing and provision of inadequate information. “<br><br>“Lack of knowledge, education and training to providing adequate pain care among pharmacists”<br><br>“Negative beliefs regarding bed rest in acute LBP management among pharmacists.”<br><br>“Lack and need for ongoing education and training for community pharmacists about low back pain to ensure evidence-based information is implemented (e.g. around advice to stay active and avoid prolonged periods of bed rest -> often ignored and increases health risk to consumers and costs to society). Need to counsel on non-pharmacological therapies with known benefits such as exercise (synergistic effect). - Over-cautious attitude towards low back pain among healthcare professionals may result in the inappropriate management of this condition.”<br><br>“Pharmacists also reflected on the current general lack of guidance to manage pain within pharmacy compared with the promotion and availability of management tools for other health conditions.”<br><br>“Lack of operational knowledge in relation to screening clients for serious causes of LBP.”<br><br>“Some gaps in the CPs’ knowledge, especially on the relationship between LBP and physical exercises, could be easily filled out by specific educational programs. However, the efficacy of educational interventions varies based on LBP types, intervention duration, and format.”<br><br>“Need for clinical guidance to be tailored for use by community pharmacists and their teams and which does not conflict with other accepted guidance.”<br><br>“Difficulty of measuring the appropriateness of minor ailment management in the community pharmacy setting.”<br><br>“Need for pharmacists and their staff to enhance their consultation skills not only through improved communication performance, but also by expanding their knowledge of health conditions. This |

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| | | | would maximise the effectiveness of the management of minor ailments in the community pharmacy setting."<br><br>"Important deficiencies in the oral healthcare knowledge of pharmacists. "<br><br>"Barriers to health promotion in pharmacies: (i) no liaison with other primary care team members, (ii) lack of space, (iii) lack of finance from health authority and (iv) lack of courses."<br><br>"lack of distinction between the different Non-steroidal anti-inflammatory drugs (NSAIDs) resulting in a "class effect bias"; ingrained negative perceptions of NSAIDs, as well as lack of overall understanding with regards to ibuprofen safety and tolerability, and the lack of confidence to put this knowledge into "<br><br>"risk of hepatic toxicity associated with paracetamol, particularly in high doses -> adherence to guidelines for both pain and fever is often suboptimal despite its availability. Some pharmacists may even lack adequate knowledge of evidence-based practice for OTC medicines and make recommendations that lacks evidence. barriers to adherence vary not only across guidelines but also across recommendations within guidelines. "<br><br>" perceptions of the condition's seriousness, clinicians' preparedness, clinicians' personal beliefs, and dissonant patient expectations. - lack of content knowledge, as well as a lack of appreciation of and trust in how guidelines are developed"<br><br>"Only approximately half of the pharmacists report having recent pain management training. Majority of the pharmacists agreed that guidelines are both useful and important, however, many also believed that "Clinical experience" is just as important as following clinical guidelines. pharmacists value both guidelines as well as experience when making therapeutic decisions."<br><br>"Pharmacological counselling provided by pharmacists: some reported that pharmacists lacked empathy and listening skills"<br><br>"Need for Australian adults experiencing pain to seek the expertise of qualified health professionals, such as pharmacists, who are equipped with the knowledge and tools to identify any potential inadequacy in treatment and offer alternative and more effective pain management strategies to their patients."<br><br>"The necessity for health professionals to listen to the needs of their patients in private and without generalization and judgement -> Cause of concern in community pharmacy settings where patients are usually consulted by pharmacists in the communal area of the pharmacy, thus jeopardizing the privacy of the "<br><br>"Many pharmacists are open to training and courses/programs given by other healthcare professionals for improving their knowledge on oral health and pain management but some express concern about the timing of the courses (39.7%) and 10.7% mentioned 12 h duty time as a barrier to attending such courses"<br><br>"Barriers preventing pharmacists from attending oral health care courses: location"<br><br>"Limitations of scopes of practice, insufficient institutional support in terms of staffing, dedicating time, training or interdisciplinary leadership support (Giannitrapani et al., 2018). appropriate |

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| | | | education and training of the pharmacy staffs involve appropriate funding whose amounts and sources remain to be defined."<br><br>"The sub-optimal pain control and scope to improve the prescribing and use of analgesics found during the pharmacist's discussion with patients in this study indicate substantial unmet pharmaceutical need among patients with knee pain and reflect the findings of the limited previous research in this area."<br><br>"Important deficiencies in the oral healthcare knowledge of pharmacists."<br><br>"Many of the pharmacists (38%) feel that lack of proper knowledge is a barrier to providing oral health care advice."<br><br>"the nature (specific or non-specific) of the low back pain -> a barrier to implementation and beyond the scope of practice for community pharmacists."<br><br>"the lack of improvement in general beliefs about back pain or physical activity-related beliefs and in pain or disability in this trial."<br><br>"limited studies that have assessed the frequency and quality of pharmacist–patient oral health consults"<br><br>"Importance of non-dental health professionals such as pharmacists to be active in oral disease prevention, health promotion and reducing oral health disparities. pharmacists' general knowledge and education in oral healthcare to be poor."<br><br>"Need to examine the level of pharmacist training, the extent to which pharmacists who receive oral health training implement them in practice, and extended roles where pharmacists could improve oral healthcare in collaboration with dental and general practitioners"<br><br>"The majority (84%) were confident in recommending and giving advice about oral health products, however, only 68% of pharmacists were confident in identifying oral health conditions in patients."<br><br>"Need for pharmacists to be further informed and educated regarding the signs and management of opioid dependence and potential drugs interactions with anti-inflammatory medications." |
| | Limited allied healthcare professional Interactions | | "Need for better communication and collaboration with other HCPS -> Collaboration with HCPs such as general practitioners. Advent of 'Meds-check' where we use the Guild care program [a professional, nationally recognized pharmacy care program] that flags patients that could potentially benefit from a medications check."<br><br>"Need for staff involvement and allied healthcare professionals."<br><br>"Need for imaging in acute LBP ("X-rays of the lumbar spine are useful in the workup of patients with acute")"<br><br>" Need for strengthened collaboration between pharmacists and prescribers. "<br><br>"The results show that patients experience measurable gains when health care professionals from community pharmacies and physiotherapy clinics are partnered with primary care physicians for OA management." |

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| | | | "Barriers to health promotion in pharmacies: (i) no liaison with other primary care team members, (ii) lack of space, (iii) lack of finance from health authority and (iv) lack of courses."<br><br>"few pharmacists had ever met the staff at their local dental practice, didn't know the opening times of the practice or indeed even the emergency arrangements."<br><br>"Limited interaction with their colleagues and dental professionals."<br><br>"Issues with pharmacist-led medicines review is how those changes in medicines are implemented. - Reviews of medicines carried out by non-medical health care professionals may result in an increase in workload for GPs because of referrals following review."<br><br>"Need for pharmacists to be incorporated into multidisciplinary oral healthcare teams together they should create a joint pathway of care to meet the needs of the local population." |
| | Lack of patient-oriented programs & practice tools | | "Need for screening tools which could help them identify red flags associated with acute onset LBP and could easily be referred to in practice."<br><br>"The need for flexibility in delivering acute pain management service, utilizing technology such as the Internet and methods that would be minimally invasive to patients, as their pain may restrict physical access to the pharmacy."<br><br>"Need to assess patient motivation"<br><br>"Lack of practice tools/guidelines in supporting the decision-making (recommendations) of health professionals such as community pharmacists who commonly manage LBP"<br><br>"Need for clinical guidance to be tailored for use by community pharmacists and their teams and which does not conflict with other accepted guidance."<br><br>"Some current tools such as the Medication Related Consultation Framework (MRCF) are used for pharmacists to develop their consultations skills in general. However, elements of the framework lack face validity in relation to the management of over-the-counter consultations, e.g. confirmation of patient's identify, documentation of full medical history. The need for tighter regulatory control for pharmacy support staff is paramount, as is the provision of effective and ongoing training for these vital members of the pharmacy workforce."<br><br>"Difficulty of measuring the appropriateness of minor ailment management in the community pharmacy setting."<br><br>"evidence supporting that clinical guidelines are being followed by healthcare professionals (particularly pharmacists) are more limited and variable"<br><br>"perceptions of the condition's seriousness, clinicians' preparedness, clinicians' personal beliefs, and dissonant patient expectations."<br><br>"lack of content knowledge, as well as a lack of appreciation of and trust in how guidelines are developed." |

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| | | | " Need for Australian adults experiencing pain to seek the expertise of qualified health professionals, such as pharmacists, who are equipped with the knowledge and tools to identify any potential inadequacy in treatment and offer alternative and more effective pain management strategies to their patients."<br><br>"Importance of non-dental health professionals such as pharmacists to be active in oral disease prevention, health promotion and reducing oral health disparities. pharmacists' general knowledge and education in oral healthcare to be poor."<br><br>"In this study, only approximately one in 10 pharmacists had oral health emergency referral procedures in place. - Cohen reported pharmacists' were consulted as frequently as medical doctors and twice as frequently than emergency departments for toothache pain."<br><br>"Difficulties of creating awareness and promoting clinical tools to pharmacists throughout Australia. Even when pharmacists were aware of the availability of the clinical tools, repeated access was limited especially in younger pharmacists. This presents a challenge when creating a tool that can be easily integrated and implemented in clinical practice."<br><br>"The majority of the comments related to their lack of awareness and accessibility to the tools." |
| | Time constraints | | "Strategies to reduce the time taken to recruit patients would be key to improving participation in clinical trials: greater advertising e.g. easy to read brochures, posters and campaigns to raise patient awareness."<br><br>"Pharmacist time: Time consuming, lack of time (finding patient history, explaining the trial and it is not feasible when they have other customers waiting), busy, and short staffed. Time is a very rare commodity in a community pharmacy."<br><br>"Pharmacist and patient time: Sometimes there is no time to explain the study to people and try and recruit them. With all the new responsibilities given to pharmacists including MedScreens. Being busy with other admin work within the pharmacy (time is limited, fast-paced nature of running dispensary and pharmacy store, and dealing with multiple patient's and their issues/prescriptions require not only most of our time and concentration)"<br><br>"Many pharmacists are open to training and courses/programs given by other healthcare professionals for improving their knowledge on oral health and pain management but some express concern about the timing of the courses (39.7%) and 10.7% mentioned 12 h duty time as a barrier to attending such courses."<br><br>"Lack of time (extended working hours preventing their professional progress). Most pharmacists work about 64h/week with an average of 9.14h/day. While 39.7% did express concern about the timing of courses and 10.7% mentioned 12 h duty time as a barrier to attend such courses."<br><br>"time-associated constraints could hinder pharmacist-based intervention (Graham-Clarke, Rushton, Noblet, & Marriott, 2018)."<br><br>"Reasons for non-compliance with protocols are reported in the literature, including a fear of consumers' resentment to questioning, a busy pharmacy schedule, time constraints and previous use of the product by the consumer." |

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| | Lack of patient knowledge | | |
| Barriers for Patients | Confidentiality & privacy concerns | | |
| | Lack of community awareness of the role of community pharmacists | | |
| | Limited knowledge & self-medication | Patients' limited knowledge on pain condition | "Lack of confidentiality and privacy."<br><br>"The necessity for health professionals to listen to the needs of their patients in private and without generalization and judgement -> Cause of concern in community pharmacy settings where patients are usually consulted by pharmacists in the communal area of the pharmacy, thus jeopardizing the privacy of the patient"<br><br>" Reasons for non-compliance with protocols are reported in the literature, including a fear of consumers' resentment to questioning, a busy pharmacy schedule, time constraints and previous use of the product by the consumer." |
| | | Patients' limited knowledge on pain management regimen | "A simple colour brochure, tear-off pad, to explain roughly what is involved and what to expect."<br><br>"Patients were reluctant to take paracetamol for their pain"<br><br>"Patients seeking what they perceived to be stronger pain relief for their back pain e.g. combination opioid analgesic medicine or anti-inflammatory drug."<br><br>"Encouraging a discussion with patients about their medication has emerged as an important screening item for possible vertebral fracture in people presenting with acute-onset LBP, particularly as certain classes of drugs such as antiepileptics and long term use of corticosteroids can increase the risk of bone fracture."<br><br>"Some customers have no awareness regarding generic and brand drugs and they believe that generic drugs are not effective, especially if the product is from a local pharmaceutical factory."<br><br>"Many patients with dental pain indulge in self-medication which is potentially harmful, there is a need for public education regarding both what to do and what not to do when suffering from dental pain. The message that analgesics do not eliminate dental pathology needed to be stressed to some groups of the population."<br><br>"Need for patients to be guided on which analgesics sold over the counter in pharmacies are the most effective and which are the safest. This guidance should be coupled with advice on the safe dosage of any analgesic used as an interim measure, and on the need to seek the necessary dental treatment early."<br><br>"The lack of information about patients' adherence to treatment, which is likely to be an important determinant of clinical outcome." |

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| | | | “Given patients’ confusion about nonprescription pain medications, physicians and pharmacists should alert patients to maximum daily analgesic doses and the potential for over medicating with multiple products.”<br><br>“Barrier (Patient Education): A cross-sectional survey performed in Alabama in patients more than 65 years old revealed that individuals with lower income and education reported significantly less risk aware-ness for OTC and prescribed NSAIDs, with important racial/ethnic differences in risk awareness, communication, and behaviour at the expense of the African American community (Fry et al., 2007).This kind of study highlights and reinforces the need to systematically probe pain patients about their self-medication practices and concerns, and also about pain status regarding, for instance, intensity and duration (Mehuys et al., 2019)”<br><br>“the lack of improvement in general beliefs about back pain or physical activity-related beliefs and in pain or disability in this trial.”<br><br>“Patients can report high levels of satisfaction despite inadequate pain management , and expectations may change with accumulating experience as the expectation of acute is reassessed and downgraded in likelihood, especially by the person living with persistent or recurrent LBP.” |
| | | Caregiver’s (e.g., friend or family member) limited knowledge of patient’s acute pain condition | “When relatives of patient are the ones to present the patient's symptoms and conditions and it is possible that some information may be omitted or incorrectly relayed by the relative, which may alter the care pathway for the patient (e.g. unable to gauge important cues relating to pain severity that would e obvious through facial/body expressions and tone of voice).” |
| | | Self-medicating without guidance | “Minimal inappropriate dosing”<br><br>“Many patients with dental pain indulge in self-medication which is potentially harmful”<br><br>“patients frequently use OTCs to self-manage their pain.”<br><br>“Patients presenting at pharmacies to self-medicate with mild-to-moderate acute or chronic pain.”<br><br>“The World Health Organization (WHO) defines self-medication as the selection and use of OTC or prescribed medicines by individuals to treat self-recognized illnesses or symptoms”<br><br>“Study: Eickhoff et al. Pharmacoepidemiol Drug Saf 2012 -> Drug: OTC drugs including antalgics -> Pain condition: Requests for OTC drugs for various symptoms, mainly pain (25%) -> Number of patients: 11,069 customers of 103 German community pharmacists -> Risk: Main risks identified: Inappropriate self-medication (29.7%) or requested products (20.5%) Risks related to analgesic OTC medications.”<br><br>“Ibuprofen is often reported as the most frequently used both in the United States and Europe.”<br><br>“prescribed analgesics were preferred in older adults or obese adults with medium or high socioeconomic status.”<br><br>“This kind of study highlights and reinforces the need to systematically probe pain patients about their self-medication practices and concerns, and also about pain status regarding, for instance, intensity and duration (Mehuys et al., 2019)” |

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| | | | “Cost: Selective COX-2 inhibitors were significantly more expensive than the other analgesics, and hence may not always be the analgesic of choice although this group of drugs has lesser gastrointestinal problems than the non-selec-tive NSAIDs” |
| | Time constraints | Lengthy Paperwork | “simplification of the paperwork (Easy to understand handouts). Forms are quite time consuming; a simpler, more streamlined, single paged form would've been ideal, and maybe a simplified consent form for the patient, with carbon copies for record keeping.” |
| | | Urgency for Instant Pain-Relief | “Time pressure: Patients are in a hurry, or their pain leaves them in an unsuitable state of mind for discussing complicated matters.”<br><br>“Patient Time: When it comes to acute pain, they want something available now and to give them relief since they tend to be grumpy even when they are eligible for the study (short on time in metropolitan area)”<br><br>“Reasons for non-compliance with protocols are reported in the literature, including a fear of consumers’ resentment to questioning, a busy pharmacy schedule, time constraints and previous use of the product by the consumer.” |

| Facilitators-Solutions in Acute Pain Care & Management | | | | |
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| **Theme** | **Subtheme** | **Subtheme 2** | **Subtheme 3** | **Quotes** |
| Facilitators for Community Pharmacists | Increasing collaboration between healthcare professionals | | | "Collaboration with HCPs such as general practitioners."<br><br>"Support from professional and government bodies such as Medicare and the Pharmacy Guild would be crucial to implement the program."<br><br>"It aims to empower the pharmacist to offer evidence-based first-line care beyond medicines advice, and stepped referral options to allied health, primary, or emergency care based on presentation or symptom progression."<br><br>"Integration of pharmacists into primary care teams should provide a significant opportunity for better communication."<br><br>"The results show that patients experience measurable gains when health care professionals from community pharmacies and physiotherapy clinics are partnered with primary care physicians for OA management."<br><br>"The need for pharmacists to be incorporated into a multidisciplinary oral healthcare team. Pharmacists should also become part of the primary healthcare team and develop a relationship with their local dental practitioners (interdisciplinary team meetings). Multidisciplinary meetings would enable liaison with other primary care team members and even more importantly this can be done on a local basis to meet the needs of the local clientele."<br><br>"The most frequently suggested ideas are listed below: Interdisciplinary meetings to discuss issues and problems eg. access to services."<br><br>"A list of key contacts to be used on an advisory basis."<br><br>"Lack of time and lack of knowledge/training can be solved by the close collaboration of health team members and meetings that can improve team spirit which will be reflected in the delivery of oral health care."<br><br>"The provision of medication review services, restructuring of the contractual framework for community pharmacy and extending prescribing rights were all part of the modernization program. For example, a UK randomised trial concluded that medication review by a pharmacist in general practice resulted in significant changes in patients' prescribed medicines and saved more than the cost of the intervention without adversely affecting the workload of general practitioners. - special arrangements: here the GPs pre-authorized the study pharmacist to make certain specified changes and so the resulting effects on workload for other professionals may not be generalizable. In the current study, the recommendation for a change in medication had to be carried out by the patient's GP although a future model could include prescribing by the reviewing pharmacist. This would be more convenient for patients and would reduce GP workload arising from reviews." |

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| | | | | "30% of pharmacists also feel that their knowledge could be improved by oral health care courses, meetings, and training programs. Multidisciplinary meetings, especially meetings with local dentists or practitioners can improve the ëteamí spirit and thereby improve the delivery of oral health care advice"<br><br>"A list of key contacts within the area of practice to be provided to pharmacists for advice regarding tobacco cessation, clarifications regarding oral health, etc."<br><br>"Use of pharmacy-dental collaborations as a strategy to reduce the amount of opioids prescribed through the identification of appropriate alternatives for post extraction pain. - This research also supports enhancing the relationship between dentists and their local community pharmacists."<br><br>"collaboration between pharmacists and dental providers has the potential toreduce opioid utilization in primary dental practice."<br><br>"In this study, fewer than 0.5% of visits resulted in an opioid order when pharmacy services were partially or fully integrated, compared with 1.8% with no integration. An increased sense of accountability due to the inclusion of another health care professional in the practice environment may have influenced prescribers to become more discerning when choosing to prescribe treatment for pain."<br><br>"This would explain the similar rates between time periods of full and partial integration compared with no pharmacy involvement."<br><br>"It is also possible that dentists who were considering prescribing an opioid chose an alternative after voluntary or required consultation with pharmacy regarding allergies, dosing, or the availability of a nonopioid analgesic. -> trend toward more opioid prescribing during partial integration compared with full integration.<br>- During the transition of hydrocodone to Schedule II, communication between dental providers and pharmacists centered on procedural changes related to prescribing hydrocodone (e.g., legal requirements on prescriptions, changes in mode of prescription transmission to pharmacies)."<br><br>"Pharmacist-led academic detailing with dentists could similarly be effective in improving knowledge and, based on the findings from the present study, lead to a potential reduction in opioid prescriptions. Pharmacists could provide specific treatment-related information, such as recommended alternatives to opioids in managing dental pain and product-specific risks."<br><br>"The need for established dental emergency referral procedures and protocols could assist these patients to access appropriate and effective care." |
| | Expanding CP knowledge and education in acute pain care | Implementing Educational Training Sessions (i.e. more interactive, in-person and | | "Training may also be extended to the pharmacy staff e.g. pharmacy assistants who are in regular contact with patients."<br><br>"Facilitating health providers' awareness of the body of knowledge around LBP can be achieved through a number of mediums, e.g. seminars, online training and face-to-face education" |

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| | | applied courses training specific community pharmacist skillset) | | "Educational intervention: Case-based learning is preferred among pharmacists as an intervention that delivers relevant evidence-based information that may serve to inform their clinical decision-making and actively engages learners (interactive exchange of ideas and experiences) in the education of appropriate acute pain care."<br><br>"Adequate training, staffing, and monetary reimbursement are needed for delivering a successful low back pain management service."<br><br>"Need to develop and deliver training programs to primary health providers regarding identifying, triaging, and appropriately managing red flag conditions, because less than half did not recommend a prompt medical review for fractures."<br><br>"Implementation of MAS with proper upskilling community pharmacists to deliver MAS in an integrated and coordinated capacity."<br><br>"Policy changes resulting in increased scope of practice for pharmacists in the area of independent prescribing."<br><br>"Effective training methods are needed to enhance consultation management in general and communication skills in particular, e.g., information gathering. There is evidence to suggest that communication behavior can be enhanced by training."<br><br>"Pharmacist's training: they can reasonably be expected to undertake more responsibilities as oral healthcare providers. A pharmacist trained in oral health can advise the public on the most appropriate choices of dental products and the use of fluoride supplements. Pharmacists also have the potential for promoting products such as dental floss and mouthwashes thereby improving periodontal health in the community. They can give advice on denture hygiene and encourage attendance at the dentist for oral screening."<br><br>"There were positive responses from pharmacists when asked about developing their knowledge through courses or oral health programmes."<br><br>"More oral health courses and that they be recognised for continued professional development."<br><br>"majority of the pharmacists strongly agree/agree (89%) that they would benefit from more training/education on pain management"<br><br>"Both clinical guidelines and clinical experience are critical to the application of evidence-based practice and are essential to patient care -> Primary care management should be holistic and evidence-based, incorporating both pharmacological and non-pharmacological approaches, including complementary therapies and comprehensive management programs."<br><br>"Many pharmacists are open to training and courses/programs given by other healthcare professionals for improving their knowledge on oral health and pain management but some express concern about the timing of the courses (39.7%) and 10.7% mentioned 12 h duty time as a barrier to attending such courses." |

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| | | | | "Lack of time and lack of knowledge/training can be solved by the close collaboration of health team members and meetings that can improve team spirit which will be reflected in the delivery of oral health care."<br><br>"pharmacist-led medication may play a major role in pain management, especially in OTC drugs management. - Specialised education and training of the pharmacy staff - > savings induced by a decrease in GP visits and the reimbursement of prescribed medication must be balanced with the costs of trainings and time dedicated to the intervention."<br><br>"30% of pharmacists also feel that their knowledge could be improved by oral health care courses, meetings, and training programs."<br><br>"Organise training programs to reinforce professional responsibility."<br><br>"Most pharmacists agreed that they would benefit from more training and education about back pain. Training to improve the confidence and ability of pharmacists to provide advice about the management of back pain may provide a useful model for improving other aspects of supported self-care. This would support UK Government policy for making support for self-care in long term conditions widely available via pharmacies."<br><br>"pharmacists may require more comprehensive training to enhance their ability and confidence to support consumer co-management of LBP."<br><br>"Pharmacist-led academic detailing with dentists could similarly be effective in improving knowledge and, based on the findings from the present study, lead to a potential reduction in opioid prescriptions.""Pharmacists could provide specific treatment-related information, such as recommended alternatives to opioids in managing dental pain and product-specific risks."<br><br>"Pharmacists also desired further education and training to benefit their practice in oral healthcare."<br><br>"Almost all pharmacists believed further education in oral health would be of benefit to their practice, and comprehensive product knowledge was the most important factor affecting recommendations for oral health products. This highlights the need for further pharmacist undergraduate and/or graduate oral health training and education" |
| | | Implementing Educational Workshops (i.e. Not always interactive or in-person, more theoretical and knowledge-based than | | "Educational intervention: Case-based learning is preferred among pharmacists as an intervention that delivers relevant evidence-based information that may serve to inform their clinical decision-making and actively engages learners (interactive exchange of ideas and experiences) in the education of appropriate acute pain care."<br><br>"Recommendations for future educational events included requests for specific topics on pain care to be covered more often at varied locations for easy access."<br><br>"Education on the appropriate use of imaging could help ensure accurate and reliable information relayed to individuals presenting with symptoms of LBP in primary care." |

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| | | applied, can be conducted online or electronically) | | "Designing educational tools to assist the primary care providers who commonly manage LBP in identifying cases of simple NSLBP and distinguishing these from serious red flag conditions."<br><br>"Increasing access to interventions that focus on raising the level of awareness of LBP guidelines, at undergraduate or postgraduate level."<br><br>"It is important to counsel the patient on the process that may be required to get the pain under control."<br><br>"Promising therapeutic alternative to oral pain medications for the treatment of postoperative pain."<br><br>"2-h educational workshop on the evidence-based management of LBP favorably influences pharmacists' knowledge, attitudes, and beliefs towards acute LBP so that it closely aligns with evidence-based guidelines."<br><br>"An increased level of oral healthcare knowledge, participation in local and national oral health campaigns and greater diagnostic responsibility should boost requirements for oral healthcare products thereby increasing range of stocks which would benefit the patients as well as the pharmacist"<br><br>"Production of information leaflets and provision of more courses are not expensive but are useful options."<br><br>"majority of the pharmacists strongly agree/agree (89%) that they would benefit from more training/education on pain management"<br><br>"pharmacist-led medication may play a major role in pain management, especially in OTC drugs management. - Specialised education and training of the pharmacy staff -> savings induced by a decrease in GP visits and the reimbursement of prescribed medication must be balanced with the costs of trainings and time dedicated to the intervention."<br><br>"74%t feel that oral health care and details regarding oral hygiene products should be made a part of their curriculum. Information disseminated through leaflets/pamphlets/posters was the preferred choice of many pharmacists for improving their knowledge regarding oral health (funding for more inexpensive options during national oral health campaigns)."<br><br>"The undergraduate pharmacy curriculum should provide opportunities for students to develop their communication skills."<br><br>'Pharmacists also desired further education and training to benefit their practice in oral healthcare."<br><br>"Almost all pharmacists believed further education in oral health would be of benefit to their practice, and comprehensive product knowledge was the most important factor affecting recommendations for oral health products. This highlights the need |

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| | | | | for further pharmacist undergraduate and/or graduate oral health training and education"<br><br>"Almost all (97%) pharmacists believed further education in oral health would be of benefit to their practice." |
| | | Implementing Simulated Patient Visit Scenarios | | "Simulated patient visits can be used to assess the actual involvement of quality of care obtained from community drug retail outlets within communities. When used in combination with feedback, they can be a very useful means of promoting the proper management of minor ailments in a community setting."<br><br>"simulated patient technique may be a more appropriate way to assess actual practice."<br><br>"Conduct more studies assessing the effectiveness of tailored pharmacy-specific pain management services, for example, longitudinal intervention studies implemented over a predetermined period of time in a community pharmacy setting."<br><br>"Vignettes are reported to be a valid way to collect information about the quality of clinical practice when compared with standardised patients (the gold standard method)." |
| | Implementing patient-oriented programs & point of care tools | Developing CP-Led Patient-Oriented Programs (e.g. services, care programs, follow-up services, medication review services, etc.) | | "Advent of 'Meds-check' where we use the Guild care program [a professional, nationally recognized pharmacy care program] that flags patients that could potentially benefit from a medications check."<br><br>"Implementation of a low back pain management service would have direct benefit to the patient (improved pain management) and broader benefits to society (reducing health and economic burden associated with low back pain)."<br><br>"Most pharmacists noted that follow-ups would be feasible and beneficial since it encourages pro-activity and shows patients that they care about progress and results. Their uptake would be best received if the patient lives locally or is a regular pharmacy client. Follow-ups should take place within days and then weeks. The only issue is that follow-ups can be time-consuming and not warranted for an acute episode."<br><br>"An education module on the evidence-based management of LBP could be delivered to pharmacists in conjunction with training for the CDSS, which would assist with knowledge of screening for pathology and give context to the guideline-based care options suggested by the CDSS."<br><br>"A prescription drug monitoring program, currently nonexistent in Quebec, could thus be beneficial to all professionals, helping to reduce misuse and abuse while also addressing many pharmacotherapy-related problems reported by pharmacists."<br><br>"Quality standards for the management of minor ailments are needed by which practice can be consistently, fairly, and accurately assessed (to achieve safe and effective patient care)."<br><br>"A 'Pathways File' was suggested to meet most of the above criteria/recommendations. Pharmacists supported this idea and asked if they could |

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| | | | | take part in formulating one to meet the needs of their local area. A 'Pathways File' would be likely to take the format of flow diagrams to assess an end solution or relevant referral. There would be constant mailings of updates on courses, campaigns and their relevant contacts, leaflet distribution possibilities and sources and dates for regular interdisciplinary meetings. This file would have to be centrally coordinated by the PCT or Local Pharmacy Committee."<br><br>"Both clinical guidelines and clinical experience are critical to the application of evidence-based practice and are essential to patient care -> Primary care management should be holistic and evidence-based, incorporating both pharmacological and non-pharmacological approaches, including complementary therapies and comprehensive management programs."<br><br>"Conduct more studies assessing the effectiveness of tailored pharmacy-specific pain management services, for example, longitudinal intervention studies implemented over a predetermined period of time in a community pharmacy setting."<br><br>"The provision of medication review services, restructuring of the contractual framework for community pharmacy and extending prescribing rights were all part of the modernization program. For example, a UK randomised trial concluded that medication review by a pharmacist in general practice resulted in significant changes in patients' prescribed medicines and saved more than the cost of the intervention without adversely affecting the workload of general practitioners. - special arrangements: here the GPs pre-authorized the study pharmacist to make certain specified changes and so the resulting effects on workload for other professionals may not be generalizable. In the current study, the recommendation for a change in medication had to be carried out by the patient's GP although a future model could include prescribing by the reviewing pharmacist. This would be more convenient for patients and would reduce GP workload arising from reviews."<br><br>"In England, a new National Health Service (NHS) contract for community pharmacists was implemented in April 2005. This gives them an expanded role in which they are expected to take a more central position managing patients with long term conditions and supporting self-care."<br><br>"The need for established dental emergency referral procedures and protocols could assist these patients to access appropriate and effective care."<br><br>"pharmacists followed the protocols and provided a better degree of intervention as expected by the patients who sought this type of professional pharmacist advice."<br><br>" Clinical decision support systems (CDSS) to assist with standardizing the approach to healthcare where they can be used for prevention and screening, medication dosing, and medical management of acute diagnosis. Gives rise to potential for significant improvement in practice and outcomes." |
| | | Developing Pharmacy Practice Tools | | "Need for screening tools which could help them identify red flags associated with acute onset LBP and could easily be referred to in practice."<br><br>"Pharmacists agreed that they would benefit from stepwise and easy to understand diagnostic tools for identifying red flags." |

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| | | | | “The need for flexibility in delivering acute pain management service, utilizing technology such as the Internet and methods that would be minimally invasive to patients, as their pain may restrict physical access to the pharmacy.”<br><br>“Online educational tools can facilitate timely access of evidence-based education to pharmacists living in rural and remote locations.”<br><br>“The application of validated tools allowed the CPs to intercept patients who had never reported their problem to their physicians, despite having a high degree or high risk of disability. Thus, validated tools can be valuable in reducing the long-term expenditures of the healthcare system.”<br><br>“Ability for CPs to readily access clinical and up-to-date resources that can be used as tools to aid in their assessment, diagnosis and treatment of health conditions. Resources such as the Australian Medicines Handbook and the Australian Therapeutic Guidelines provide pharmacists with therapeutic information in the context of LBP management.”<br><br>“Screening tools: better identify patient profiles regarding responsible self-medication and, consequently, develop multichannel-available tools (leaflet, apps) allowing a quick assessment by pharmacist and GPs regarding the level of risk associated with self-medication (e.g. low, medium, high) for a given patient (James and French, 2014; Tong et al, 2014). Such delivery-assisting tools would not be expected to replace the HCP's decision but to make it more efficiently focused on each patient specificities and needs.”<br><br>“an individualised, multimodal approach to management, incorporating specific skills (i.e. ‘doing’: for example, the skill of pacing activity) rather than solely providing simple evidence-based knowledge (‘knowing’: avoiding prolonged bed rest) especially for more complex, persistent LBP) -> pamphlet messages were delivered in a more comprehensive framework incorporating a skills component -> the work-related beliefs outcomes may be even better.”<br><br>“To help with the management of patients using OTC combined analgesics containing codeine medications (OTC CACC), the development of a referral pathway would be advantageous”<br><br>“Clinical decision support systems (CDSS) to assist with standardizing the approach to healthcare where they can be used for prevention and screening, medication dosing, and medical management of acute diagnosis. Gives rise to potential for significant improvement in practice and outcomes.”<br><br>“Evaluating the effects of clinical tools on patient care and outcomes.”<br><br>“The number of referrals to outside services and the quality and appropriateness of these referrals”<br><br>“A cost-benefit analysis of utilizing such clinical tools into practice.” |

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| | | | | "Looking at pharmacist outcomes i.e. provision of advice, treatment given and patient outcomes could be a useful measure of effectiveness and usefulness of these tools in a community setting." |
| | Providing financial, promotional & institutional support | | | "monetary reimbursement"<br><br>"Support from professional and government bodies such as Medicare and the Pharmacy Guild would be crucial to implement the program."<br><br>"Compensation for service delivery and re-statement of the role and responsibility of community pharmacist may result in a better service delivery."<br>"Policy and funding alignment for future sustainability."<br><br>"Funding and provision of more continuing professional development (CPD) recognised oral health courses. Funding for information leaflets, especially during national oral health campaigns."<br><br>"adequate remuneration and staff training were critical factors to its implementation."<br><br>"Information disseminated through leaflets/pamphlets/posters was the preferred choice of many pharmacists for improving their knowledge regarding oral health (funding for more inexpensive options during national oral health campaigns)."<br><br>"Funding for more opportunities for continuing professional development, such as oral health courses." |
| Facilitators for Patients | Providing community pharmacist-led services for acute pain | | | "Implementation of a low back pain management service would have direct benefit to the patient (improved pain management) and broader benefits to society (reducing health and economic burden associated with low back pain)."<br><br>"Adequate training, staffing, and monetary reimbursement are needed for delivering a successful low back pain management service."<br><br>"The need for flexibility in delivering acute pain management service, utilizing technology such as the Internet and methods that would be minimally invasive to patients, as their pain may restrict physical access to the pharmacy."<br><br>"Most pharmacists noted that follow-ups would be feasible and beneficial since it encourages pro-activity and shows patients that they care about progress and results. Their uptake would be best received if the patient lives locally or is a regular pharmacy client. Follow-ups should take place within days and then weeks. The only issue is that follow-ups can be time-consuming and not warranted for an acute episode."<br><br>"Their widespread presence in any geographical area and frequent contact with patients potentially provide the CPs with many support tools, such as the possibility of establishing educational support interviews, performing follow-ups, and monitoring the progress of implemented interventions."<br><br>"CPs could triage the clinical symptomatology of patients, and provide information and advice with patients with "red flags" to seek medical care." |

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| | | | | “Community pharmacists in the United Kingdom have been linked with a new role as “supplementary prescribers,” which allows them to review and, if necessary, prescribe certain drugs within an agreed clinical management plan for patients whose condition has been assessed by an independent prescriber (such as the general practitioner). Interventions by pharmacists have been shown to favorably influence prescribing to reduce adverse drug reactions, improve the appropriateness of drug use, reduce drug costs, and improve compliance in a range of conditions.”<br><br>“Quality standards for the management of minor ailments are needed by which practice can be consistently, fairly, and accurately assessed (to achieve safe and effective patient care).“<br>“In England, a new National Health Service (NHS) contract for community pharmacists was implemented in April 2005. This gives them an expanded role in which they are expected to take a more central position managing patients with long term conditions and supporting self-care.”<br><br>“use of pharmacist-led quality improvement initiatives with the use of chart reviews specific to opioid prescribing patterns in dental practice.”<br><br>“The need for established dental emergency referral procedures and protocols could assist these patients to access appropriate and effective care.” |
| | Implementing digital health tools for education and guidance | | | “The need for flexibility in delivering acute pain management service, utilizing technology such as the Internet and methods that would be minimally invasive to patients, as their pain may restrict physical access to the pharmacy.”<br><br>“the use of website/mobile apps as potential sources of information and education regarding pain self-medication could be useful for the whole population, and particularly for people with a limited access to a HCP (Kochhar and Gupta, 2017). Mobile pain apps may be useful to make people more engaged regarding communication about their pain and to improve the connection with HCP (Rahman et al., 2017).”<br><br>“Screening tools: better identify patient profiles regarding responsible self-medication and, consequently, develop multichannel-available tools (leaflet, apps) allowing a quick assessment by pharmacist and GPs regarding the level of risk associated with self-medication (e.g. low, medium, high) for a given patient (James and French, 2014; Tong et al, 2014). Such delivery-assisting tools would not be expected to replace the HCP's decision but to make it more efficiently focused on each patient specificities and needs.”<br><br>“Clinical decision support systems (CDSS) to assist with standardizing the approach to healthcare where they can be used for prevention and screening, medication dosing, and medical management of acute diagnosis. Gives rise to potential for significant improvement in practice and outcomes.” |
| | Implementing promotional tools for improving community awareness of | | | “The need for flexibility in delivering acute pain management service, utilizing technology such as the Internet and methods that would be minimally invasive to patients, as their pain may restrict physical access to the pharmacy.”<br><br>“the use of website/mobile apps as potential sources of information and education regarding pain self-medication could be useful for the whole population, and |

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| | community pharmacist's role | | | particularly for people with a limited access to a HCP (Kochhar and Gupta, 2017). Mobile pain apps may be useful to make people more engaged regarding communication about their pain and to improve the connection with HCP (Rahman et al., 2017)."<br><br>"Screening tools: better identify patient profiles regarding responsible self-medication and, consequently, develop multichannel-available tools (leaflet, apps) allowing a quick assessment by pharmacist and GPs regarding the level of risk associated with self-medication (e.g. low, medium, high) for a given patient (James and French, 2014; Tong et al, 2014). Such delivery-assisting tools would not be expected to replace the HCP's decision but to make it more efficiently focused on each patient specificities and needs."<br><br>"Clinical decision support systems (CDSS) to assist with standardizing the approach to healthcare where they can be used for prevention and screening, medication dosing, and medical management of acute diagnosis. Gives rise to potential for significant improvement in practice and outcomes." |
| | Reducing time constraints with promotional tools & simplified paperwork | Health Promotion Tools | Implementing Easy-to-Read and Simple Written Material (e.g. leaflets, pamphlets, booklets, brochures, etc.) on Acute Pain Condition and Management | "A simple colour brochure, tear-off pad, to explain roughly what is involved and what to expect."<br><br>"Production of information leaflets and provision of more courses are not expensive but are useful options."<br><br>"Oral health information leaflets to be given to clients on a'need to' basis."<br><br>"Screening tools: better identify patient profiles regarding responsible self-medication and, consequently, develop multichannel-available tools (leaflet, apps) allowing a quick assessment by pharmacist and GPs regarding the level of risk associated with self-medication (e.g. low, medium, high) for a given patient (James and French, 2014; Tong et al, 2014). Such delivery-assisting tools would not be expected to replace the HCP's decision but to make it more efficiently focused on each patient specificities and needs."<br><br>"Information disseminated through leaflets/pamphlets/posters was the preferred choice of many pharmacists for improving their knowledge regarding oral health (funding for more inexpensive options during national oral health campaigns)."<br><br>"The use of written materials such as a relevant book or leaflet could enhance the customer's understanding of the ailment and medication recommended."<br><br>"Promoting greater awareness of The Back Book among pharmacists is one obvious way to make evidence based information directly available to their staff and customers."<br><br>"education booklets and pamphlets for improving knowledge and outcomes for consumers with LBP -> pamphlets based on a biopsychosocial model of pain rather than a biomedical model were associated with improved consumer beliefs regarding physical activity, pain and consequences of LBP." |

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| | | | | "the use of a relatively inexpensive evidence-based pamphlet to help improve work-related fear avoidance beliefs, would appear to be a simple and positive component of a health intervention for consumers with LBP."<br><br>"an individualised, multimodal approach to management, incorporating specific skills (i.e. 'doing': for example, the skill of pacing activity) rather than solely providing simple evidence-based knowledge ('knowing': avoiding prolonged bed rest) especially for more complex, persistent LBP) -> pamphlet messages were delivered in a more comprehensive framework incorporating a skills component -> the work-related beliefs outcomes may be even better."<br><br>"Matching of messengers to messages -> adapting key pamphlet messages to be more appropriate -> focusing on the appropriate use of medications to create a therapeutic window (i.e.; one created by the use of appropriate analgesia) during which sensibly paced activity (physical activity) could be increased and staying at work encouraged. optimizing the use of a therapeutic window in order to encourage the adoption of positive health behaviours such as increasing active self management, may be important as beliefs and behaviour for consumers with persistent LBP do not necessarily match." |
| | | | Implementing Promotional Tools (e.g. campaigns, posters, advertisements, etc.) on Acute Pain Care & Management Services | "Strategies to reduce the time taken to recruit patients would be key to improving participation in clinical trials: greater advertising e.g. easy to read brochures, posters and campaigns to raise patient awareness."<br><br>"Help with window displays during national public health campaigns."<br><br>"Produce information relevant to the area the pharmacist is based in."<br><br>"In Australia, a large public health campaign was successful in improving attitudes to back pain. The campaign also reduced functional disability related to back pain in the general population and the economic impact of back pain"<br><br>"The benefits of a mass media campaign that provided similar evidence-based messages at a population level, is evidenced by the significant improvements in both community and physician beliefs and the associated decline in number of workers' compensation back claims and health utilization over the duration of, and sustained at 3 years beyond, the campaign."<br>"direct promotion of clinical tools may increase access and should be investigated further." |
| | | Simplifying current paperwork or hand-written material (e.g. medication logs, pain score forms, etc.) | | "simplification of the paperwork (Easy to understand handouts). Forms are quite time consuming; a simpler, more streamlined, single paged form would've been ideal, and maybe a simplified consent form for the patient, with carbon copies for record keeping."<br><br>"Amount of paperwork required of them." |

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| | Providing education on acute pain condition & management practices | | | “It is important to counsel the patient on the process that may be required to get the pain under control.”<br><br>“Promising therapeutic alternative to oral pain medications for the treatment of postoperative pain.”<br><br>“there is a need for public education regarding both what to do and what not to do when suffering from dental pain. The message that analgesics do not eliminate dental pathology needed to be stressed to some groups of the population.”<br><br>“Need for patients to be guided on which analgesics sold over the counter in pharmacies are the most effective and which are the safest. This guidance should be coupled with advice on the safe dosage of any analgesic used as an interim measure, and on the need to seek the necessary dental treatment early.”<br><br>“Need to better inform choice, and the reasoning behind self-preference as a major factor would be worth exploring”<br><br>“A number of supplementary questions sought information on respondents' experience of dental care and toothache since this might influence their preferences in self-medication and from whom advice might be sought.”<br><br>“Their widespread presence in any geographical area and frequent contact with patients potentially provide the CPs with many support tools, such as the possibility of establishing educational support interviews, performing follow-ups, and monitoring the progress of implemented interventions.”<br><br>“Given patients’ confusion about nonprescription pain medications, physicians and pharmacists should alert patients to maximum daily analgesic doses and the potential for over medicating with multiple products. Patients should be advised that, if pain is not adequately controlled on the recommended treatment, they should return to their physicians or clinics rather than take additional nonprescription products that might increase their risk of adverse events.: |

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| | | | | “Patient Considerations: Knowledge of patients provides an important context for understanding their pain and tolerance levels (tailor medications and messages to individual patients, reassurance, specialist consultation and testing). Awareness of patients’ preferences can prevent their returning with symptoms without having filled their prescriptions. should explain what the prescribed drug is for, the benefits and risks of therapy, the length of treatment, and when to return for re-assessment.”<br><br>“An increased level of oral healthcare knowledge, participation in local and national oral health campaigns and greater diagnostic responsibility should boost requirements for oral healthcare products thereby increasing range of stocks which would benefit the patients as well as the pharmacist”<br><br>“Production of information leaflets and provision of more courses are not expensive but are useful options.”<br><br>“Patient Education: pharmacists who appropriately educate patients (in the area of pain management) enables them to manage their pain more effectively. - adequate remuneration and staff training were critical factors to its implementation.”<br><br>“the use of website/mobile apps as potential sources of information and education regarding pain self-medication could be useful for the whole population, and particularly for people with a limited access to a HCP (Kochhar and Gupta, 2017). Mobile pain apps may be useful to make people more engaged regarding communication about their pain and to improve the connection with HCP (Rahman et al., 2017).”<br><br>“Support for window displays, especially about targeting health issues, including oral health.”<br><br>“The use of written materials such as a relevant book or leaflet could enhance the customer’s understanding of the ailment and medication recommended.” |

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| | | | | “Promoting greater awareness of The Back Book among pharmacists is one obvious way to make evidence based information directly available to their staff and customers.”<br><br>“education booklets and pamphlets for improving knowledge and outcomes for consumers with LBP -> pamphlets based on a biopsychosocial model of pain rather than a biomedical model were associated with improved consumer beliefs regarding physical activity, pain and consequences of LBP.”<br><br>“supporting information with verbal reinforcement from health professionals” |