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Chronic Pain Abstracts

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Chronic pelvic pain in transgender and gender-diverse people: a scoping review

Submission ID

93

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INTRODUCTION

Chronic pelvic pain (CPP) is a disabling, multifactorial condition frequently accompanied by urinary, bowel, and sexual dysfunction and by other chronic overlapping pain conditions (Maixner et al., 2016). Despite expanding access to gender-affirming hormone therapy (GAHT) and gender-affirming surgeries, transgender and gender-diverse (TGD) people remain remarkedly under-represented in CPP research. Available evidence suggests that pelvic and genital pain may occur across the gender-affirming care continuum, including prior to medical transition, during GAHT, and following surgery (Grimstad et al., 2020; Zwickl et al., 2023). However, the prevalence, mechanisms, and optimal management of CPP in TGD populations remain poorly characterized. We therefore conducted a scoping review to map the global evidence on CPP in TGD people, synthesizing data on prevalence and symptom burden, proposed etiologic mechanisms, assessment approaches, and reported management strategies, with the aim of informing equitable, clinically actionable pelvic pain careC.

METHODS

We conducted a scoping review in accordance with Joanna Briggs Institute (JBI) methodology and reported findings following the PRISMA-ScR guidelines (Tricco et al., 2018). We searched MEDLINE (Ovid), Embase, APA-PsycINFO, CINAHL, and Web of Science from databased inception to July 2025 using controlled vocabulary and keywords for chronic pelvic or abdominopelvic pain and TGD people. We included primary studies including adults identifying as TGD and reporting chronic pelvic/genital or CPP-adjacent symptoms

lasting ≥ 3 months (aligning with the ICD-11 definition), explicitly described as chronic, including persistent post–gender-affirming surgery pain beyond acute recovery. We also conducted backward and forward citation searching. Two reviewers independently screened titles/abstracts and full texts using Covidence and resolved disagreements by consensus, with third-reviewer adjudication. Using a standardized charting form, we extracted study characteristics, CPP definitions/measures, and findings across four domains: prevalence/symptom burden, etiologies, assessment, and management. In parallel, we performed an inductive thematic synthesis within each domain: two reviewers conducted line-by-line coding of extracted text, iteratively compared and refined codes, grouped them into higher-order categories/themes, and applied the finalized thematic framework across included studies, resolving discrepancies through discussion/adjudication. Findings were synthesized descriptively without meta-analysis, and JBI critical appraisal tools were used to contextualize methodological limitations.

RESULTS

The search identified 6,534 records. After removing 2,711 duplicates, 3,823 records were screened, and 25 studies were included (42 full texts; κ=0.99), representing 6,757 TGD participants (mean age 28.8 years). Study designs were predominantly cross-sectional surveys, registry-based analyses, and clinic cohorts, with fewer qualitative studies, program audits or case reports, and one randomized trial. CPP definitions and measures were heterogeneous, and transition-related variables (anatomy, GAHT, surgical history) were inconsistently reported.

Three salient contexts emerged: (1) testosterone-associated pelvic pain, often described as new-onset cramping or suprapubic pain following initiation, alongside reports of lower CPP prevalence among individuals established on testosterone; (2) postoperative pelvic or genital pain, including dilation-related pain following genital surgery, which improved for many but persisted beyond 6-12 months for a minority; and (3) frequent pelvic floor dysfunction associated with sexual, urinary, and bowel symptoms. Reported management strategies included pelvic floor rehabilitation, hormonal modulation, psychosocial supports, and surgical evaluation.

DISCUSSION

The literature on CPP in TGD people is expanding but remains dominated by cross-sectional designs, heterogeneous definitions, and non-representative sampling, limiting inference regarding prevalence and causality. Nevertheless, findings support a multifactorial model incorporating hormonal, surgical, pelvic floor, and psychosocial mechanisms. These findings highlight the need for multidisciplinary, gender-affirming approaches to pelvic pain care. For anesthesia and pain clinicians, CPP in TGD patients warrants diagnostic breadth, trauma-informed communication, and early access to coordinated care pathways including pelvic floor therapy, sexual health services, mental health support, and surgical

consultation. Research priorities include the development of validated, inclusive outcome measures and interventional studies.

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Evaluation of a pediatric to adult chronic pain transition clinic: patient perspectives

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127

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INTRODUCTION

Chronic pain significantly impairs quality of life for adolescents. Epidemiological studies indicate that 11–38% of children and youth experience chronic pain that interferes with daily functioning. For many, pain persists into adulthood, highlighting the need for effective and coordinated transition from pediatric to adult pain care. Despite this need, transitional care remains fragmented, with youth often facing long wait times and gaps in services. To address this, a joint interdisciplinary pediatric–adult chronic pain transition clinic was established through collaboration between a large academic pediatric hospital and an affiliated adult tertiary-care centre, using existing resources to support continuity of care. Since its implementation, this program has not been formally evaluated. The objectives of this study were to explore patient experiences of transition, assess satisfaction with the program, and identify opportunities for improvement among young adults transitioning to adult chronic pain care.

METHODS

Online semi-structured interviews lasting 1–2 hours were conducted with young adults who attended the transition clinic. Data were analyzed using reflexive thematic analysis as described by Braun and Clarke. Interviews were transcribed verbatim and independently coded by two reviewers. Analysts first familiarized themselves with the transcripts, generated preliminary codes, and identified recurring patterns. Themes were iteratively refined, defined, and named through consensus meetings, followed by substantive coding. Data collection and analysis proceeded concurrently until thematic saturation was achieved. This study was classified as quality improvement and program evaluation and received a waiver of Research Ethics Board review in accordance with TCPS2 Article 2.5.

RESULTS

Thematic saturation was reached after interviews with 11 participants. Key themes related to the transition clinic included feelings of gratitude, a generally smooth transition process, experiences of change, and ongoing uncertainty. While seven participants described positive experiences within the adult tertiary-care setting, most participants identified challenges following transition, particularly related to medication management and treatment continuity. Several participants noted areas where adult care processes could be optimized to better meet the needs of young adults with chronic pain.

DISCUSSION

Transitioning to adult pain care can be challenging and intimidating for youth with chronic pain. This qualitative evaluation provides insight into patient-reported experiences during transition and highlights areas of strength and opportunities for improvement. These findings can inform future refinements to transitional care models and support the development of patient-centred strategies to enhance continuity and quality of chronic pain care during this critical developmental period.

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Harms of common interventional procedures for chronic noncancer spine pain: a systematic review and meta-analysis of non-randomized studies

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155

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INTRODUCTION

Chronic, non-cancer spine pain is a leading cause of morbidity, years lived with disability, and productivity loss globally[1]. Clinicians frequently offer patients living with chronic spine pain interventional procedures, such as joint or epidural injections with corticosteroids or anesthetics, medial branch blocks or radiofrequency ablation. These procedures may be associated with rare but serious harms, such as deep infection or paralysis[2]. Randomized trials in this area typically enroll small numbers of patients followed for short time frames, limiting their ability to inform infrequent harms.

We conducted a systematic review and meta-analysis of non-randomized studies to summarize the evidence on adverse events of interventional procedures for chronic non-cancer spine pain. Our findings, as well as a second systematic review[3], informed a parallel *BMJ Rapid Recommendation* addressing interventional procedures for chronic spine pain[4]. This evidence synthesis is part of the *BMJ Rapid Recommendations* project, a collaborative effort from the *MAGIC Evidence Ecosystem Foundation* and the *BMJ*[5].

METHODS

We performed a systematic review and meta-analysis. Data sources included MEDLINE, EMBASE and CINAHL. A parallel guideline panel provided input on the scope, design, and interpretation of this systematic review, including selection of adverse events for consideration. Using standardized pilot-tested forms, three pairs of trained reviewers screened titles and abstracts of identified citations independently and in duplicate. We included all non-randomized studies in which: 1) at least 80% of participants were adult patients (>18 years old), presenting with chronic (>12 weeks or explicitly defined by study authors as 'chronic') axial and/or radicular, noncancer spine pain, (2) received an interventional procedure considered by our guideline panel and, (3) reported harms as defined by the authors. Systematic literature screening, data abstraction and risk of bias appraisal was conducted independently and in duplicate by pairs of reviewers.

We used DerSimonian-Laird random-effects models for all meta-analyses. We conducted analyses for comparative and non-comparative studies separately. Where possible, we reported risk differences with associated 95% confidence intervals (95% CIs) for comparative studies. Subroup analyses were conducted only if there were two or more studies in each subgroup. To evaluate certainty of evidence, we used the GRADE approach.

RESULTS

We included 60 longitudinal studies (56 non-comparative, 4 comparative), that enrolled 4,966 patients with chronic spine-related pain. Low certainty evidence suggests that joint targeted steroid injection, and epidural steroid injection for chronic spine pain may result in an increased prevalence of temporary altered level of consciousness (prevalence: 2.1%; 95%CI 0.7 to 4.1), joint radiofrequency nerve ablation, joint targeted steroid injection, and epidural injection of local anesthetic and steroids may increase the risk of deep infection (prevalence: 0.4%; 95%CI 0 to 1.5), and epidural steroid injection, joint radiofrequency nerve ablation, and joint targeted injection of local anesthetic and steroids may increase the risk of dural puncture (prevalence: 1.6%; 95%CI 0.2 to 3.7). Several common interventional procedures may increase prevalence of metabolic complications, and prolonged sensory deficits, pain or stiffness (prevalence ranged from 8.2% to 16.3%), but the supporting evidence was only very low certainty.

DISCUSSION

In this systematic review of observational studies, we found low certainty evidence that suggests interventional procedures for chronic spine pain may increase the prevalence of several harms. Specifically, temporary altered level of consciousness following joint targeted steroid injection, and epidural steroid injection, deep infection following joint radiofrequency nerve ablation, joint targeted steroid injection, and epidural injection of local anaesthetic and steroids, and dural puncture following epidural steroid injection, joint radiofrequency nerve ablation, and joint targeted injection of local anaesthetic and steroids. Other harms are uncertain due to very low certainty evidence.

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Table 1: GRADE evidence profile for adverse events associated with interventional procedures for chronic spinal pain in single-arm observational studies

Adverse Event	Types of Interventional Procedures Administered	No. of studies (range of follow-up)	No. of Patients	Prevalence (95% CI)	Reasons for Downgrading	Certainty of Evidence
Deep Infection	Joint radiofrequency ablation or denervation (3 studies) Fluoroscopy-guided epidural injections with both corticosteroid and local anesthetic (1 study) CT-guided joint injection with corticosteroid (1 study)	5 (12 to 90 weeks)	539	0.4% (0 – 1.5)	Risk of bias Imprecision	Low
Dural Puncture	Epidural corticosteroid injections (5 studies) Radiofrequency ablation (2 studies) Nerve blocks (1 study)	8 (12 to 52 weeks)	1097	1.6% (0.2 – 3.7)	Risk of bias Imprecision	Low
Temporary Altered Level of Consciousness	Epidural steroid injections (9 studies) Joint steroid injections (1 study)	10 (12 to 52 weeks)	1021	2.1% (0.7 – 4.1)	Risk of bias	Low
Prolonged (>48 hours) Sensory Deficits	Joint radiofrequency ablation dorsal root ganglion (2 studies) Radiofrequency ablation (2 studies) Radiofrequency neurotomy and corticosteroid injection (1 study	5 (12 to 104 weeks)	363	8.2% (1.8 – 17.9)	Risk of bias Imprecision	Very low
Prolonged (>48) Pain or Stiffness	Radiofrequency ablation procedures (16 studies)	16 (8 to 105 weeks)	1132	16.3% (7.7 – 27.1)	Risk of bias Imprecision	Very low

Ilioinguinal and iliohypogastric cryoneurolysis as an alternative treatment in patient with refractory pelvic pain seeking medical assistance in dying: a case report

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44

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INTRODUCTION

Chronic pelvic pain (CPP) is a prevalent and debilitating condition associated with impaired function, psychiatric comorbidity, and reduced quality of life.[1] In a subset of patients, pain may be mediated by peripheral nerves such as the ilioinguinal and iliohypogastric nerves, and diagnostic nerve blocks can help identify their contribution.[2] Refractory pain is a recognized contributor to requests for medical assistance in dying (MAID) in Canada, underscoring the importance of comprehensive pain assessment and consideration of available therapeutic options.[3] Cryoneurolysis is an interventional technique that produces prolonged analgesia through reversible axonal degeneration while preserving connective tissue structure.[4] It has been increasingly applied in chronic and palliative pain contexts.[5] We describe a patient with severe chronic pelvic pain who was actively pursuing MAID and experienced sustained analgesic benefit following cryoneurolysis of the ilioinguinal and iliohypogastric nerves, leading her to withdraw her MAID request.

CASE PRESENTATION

Written, informed consent was obtained from the patient for both the procedures described as well as the writing of this case report. A 48-year-old woman with a longstanding history of severe left-sided pelvic and abdominal pain was referred for pain management. Her pain was sharp, localized to the left lower quadrant, and refractory to extensive pharmacologic therapy, including high-dose opioids and ketamine. Multiple investigations and specialist assessments failed to identify a definitive etiology. Due to persistent pain, functional decline, and limited response to treatment, she had entered the MAID process and had a scheduled date.

On examination, pain was maximal and reproducible in the left lower quadrant. Ultrasound demonstrated enlargement of the left ilioinguinal and iliohypogastric nerves. Diagnostic ultrasound-guided nerve blocks produced substantial but transient analgesia, confirming peripheral nerve involvement. A short trial of neuromodulation with a simulating peripheral nerve block catheter provided brief benefit, suggesting the need for a longer-acting intervention.

Following multidisciplinary discussion, ultrasound-guided cryoneurolysis of the left ilioinguinal and iliohypogastric nerves was performed. Each nerve underwent five freeze–thaw cycles. The procedure was well tolerated without complications.
Prior to cryoneurolysis, the patient reported typical pain scores of approximately NRS 8/10. At four-month follow-up, her average pain intensity had decreased to approximately NRS 4/10, accompanied by marked improvements in functional capacity and reduced opioid requirements. Importantly, she chose to withdraw her MAID request, citing improved pain control as the reason.

CONCLUSION

This case demonstrates the importance of comprehensive, multidisciplinary pain assessment and consideration of interventional options in patients with refractory chronic pain, including those contemplating MAID. In this patient, confirmation of peripheral nerve involvement followed by stepwise interventional management culminated in cryoneurolysis, which provided sustained analgesia and contributed to withdrawal of an active MAID request. While individual patient goals and autonomy remain central, this case suggests that structured consideration of available interventional pain therapies may meaningfully alter the clinical trajectory for selected patients with severe, refractory pain.

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IV bisphosphonates for the management of pediatric complex regional pain syndrome: a retrospective control study

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135

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INTRODUCTION

Complex regional pain syndrome (CRPS) is a chronic, severe pain condition characterized by ongoing spontaneous and/or evoked regional pain that is disproportionate to the expected course of any known trauma or inciting event [1,2]. Management of pediatric CRPS remains challenging. Current best practices emphasize a multidisciplinary approach that integrates physiotherapy, psychological interventions, pharmacologic therapies, and selected pain management interventions; however, no single medical treatment has demonstrated consistent efficacy [1,3–5]. While bisphosphonates have shown benefit in adult CRPS, their effectiveness and safety in pediatric populations remain poorly defined. Within our pediatric chronic pain service, intravenous (IV) bisphosphonate therapy has been incorporated into the treatment of pediatric CRPS since 2017. This study aimed to evaluate the effectiveness, functional outcomes, and safety profile of IV bisphosphonate therapy in children and adolescents with CRPS receiving care within a multidisciplinary pain program.

METHODS

This retrospective chart review study evaluated pediatric patients diagnosed with CRPS who received care within a multidisciplinary chronic pain program. The study had two primary objectives: (1) to assess responder rates to IV bisphosphonate therapy administered every three months for a duration of 6–12 months compared with a control group receiving standard care, and (2) to evaluate the incidence, timing, and duration of treatment-related side effects and serious safety events. Responder status was defined by one or more of the following outcomes: improvement in the signs and symptoms of the Budapest criteria, a ≥30% reduction in numerical rating scale (NRS) pain scores, improvement in physical functioning or school attendance or a reduction in pain medication use. Expected side effects included acute phase reactions (fever, lethargy, nausea, vomiting) and post-infusion

pain flares (location, duration, and intensity). Safety outcomes included serious adverse events such as osteonecrosis of the jaw, asymptomatic or symptomatic hypocalcemia requiring treatment, and hypocalcemia-associated seizures. This study received approval from the institutional Research Ethics Board.

RESULTS

Seventy-two patients diagnosed with CRPS between 2013 and 2024 were included in the analysis, comprising 20 patients who received IV bisphosphonate therapy (2017 and 2024)and 52 control patients (2013-2017). Patients treated with IV bisphosphonates demonstrated a trend toward faster improvement in physical functioning, NRS pain scores, and Budapest criteria compared with controls, particularly within the first 90–180 days; however, these differences did not reach statistical significance. By one year, clinical outcomes were comparable between groups. No serious safety events were observed, including osteonecrosis of the jaw, severe symptomatic hypocalcemia, or seizures. Expected treatment-related side effects were common: 40% of patients experienced post-infusion pain flares following the first infusion, with a mean duration of 14 days. Acute phase reactions occurred less frequently. Both the frequency and duration of expected side effects decreased significantly with subsequent infusions.

DISCUSSION

IV bisphosphonate therapy may be associated with faster early improvement in pediatric CRPS, although observed differences were not statistically significant and outcomes converged over time. Treatment was not associated with serious safety concerns; however, pain flares with a mean duration of 14 days were common following initial infusions. These findings suggest that IV bisphosphonates may represent a potential adjunctive treatment for selected pediatric CRPS patients, with appropriate anticipatory guidance and support to manage post-infusion pain. Further prospective studies are needed to better define efficacy, optimal timing, and patient selection

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Methylene blue for acute and chronic pain management: a systematic review and meta-analysis

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142

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INTRODUCTION

Methylene Blue (MB) is a synthetic, cationic thiazine dye that has been widely utilized in medicine. Originally used as the first antiseptic biological stain and chemical indicator, MB now has been shown to have potential uses in treating septic shock, neurocognitive disorders, vasoplegic syndrome, hepatopulmonary syndrome, and malaria. This is in part due to its anti-oxidant and anti-inflammatory properties as an inhibitor of nitric oxide synthase and guanylate cyclase. More specifically, MB has been clinically used to manage both acute and chronic pain, yet there is no established consensus of the analgesic effects of MB. This systematic review and meta-analysis aimed to summarize the efficacy and safety of MB in the management of acute and chronic pain.

METHODS

A systematic search was conducted using MEDLINE, Cochrane, EMBASE, PubMed and Web of Science until August 25th, 2025 using a librarian-approved search strategy. References of systematic reviews were also screened for potential citations. Studies captured from the search underwent screening and data extraction in duplicate. Studies were included into the review if they enrolled adult patients (≥ 18 years of age) and used MB in any route to treat acute and chronic pain symptoms regardless of study design. Studies were excluded if the study was basic research, utilized animal models, if MB was administered perioperatively, used to treat septic shock, used as an indicator dye, and used as photodynamic therapy for dental procedures. Primary outcomes included pain scores following MB administration, patient satisfaction, and post-procedure analgesic use. Secondary outcomes included functional capacity, complication rates, fatigue and ability to perform daily activities. A meta-analysis was performed on pain scores of included randomized controlled trials (RCTs) and reported using mean differences (MD) and 95% confidence intervals (CI). A random-effects model was used, and heterogeneity assessed using the I^2 statistic. The remaining

outcomes were qualitatively analyzed and thematically summarized based on chronic pain type, route and dose of MB administration.

RESULTS

Ten RCTs (n=647) and 12 observational studies (n=549) were included into the review that evaluated MB across a range of pain conditions including discogenic low back pain, post-herpetic neuralgia, facetogenic back pain, neuropathic pain, oral mucositis pain, anal fissures, and propofol-induced pain. Of the included RCTs, eight showed positive findings on pain scores, three for improved function, four for reduced analgesic consumption, and three for improved sleep quality. In the pooled analysis of injectable MB for chronic pain, MB demonstrated a significant reduction in pain scores at one (MD -1.13, 95% CI -1.66 to -0.61, I^2=70%) and six months (MD -1.71, 95% CI -3.14 to -0.28, I^2=96%) post-treatment. Only 2 of out 22 studies commented on adverse complications, with one reporting no adverse effects [4] and the other reporting insignificantly, one case of hyperglycemia, one of nausea, two of hypertension and three of dizziness post-procedure in the MB group [5].

DISCUSSION

Despite being limited by a small number of included studies and substantial heterogeneity, our results suggest that MB may provide an analgesic effect across a number of pain conditions. Specifically, our meta-analysis indicated that MB can be helpful in providing short (one month) and long-term relief (six months) in the use of interventional chronic pain management. However, further large high-quality RCTs investigating the safety and effectiveness of MB on chronic pain need to be conducted before MB can be advocated into routine chronic pain management.

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SUPPLEMENTARY FILE (FIGURES)

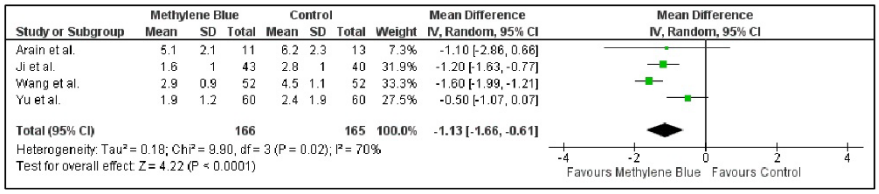

Figure 1: Forest plot for 1-month post-MB intervention. CI = confidence interval.

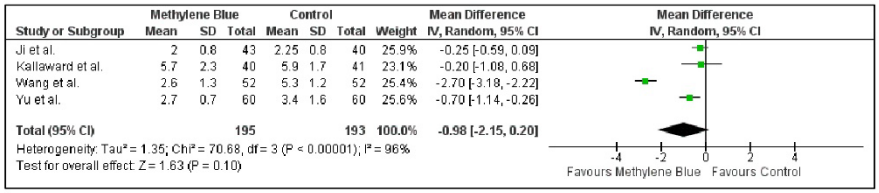

Figure 2: Forest plot for 3-month post-MB intervention. CI = confidence interval.

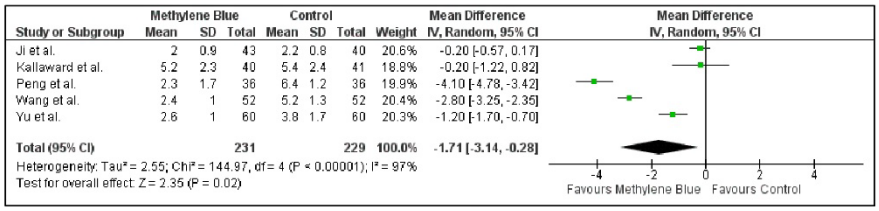

Figure 3: Forest plot for 6-month post-MB intervention. CI = confidence interval.

More than growing pains: assessing the impact of an interdisciplinary pediatric-adult chronic pain clinic on transition to adult pain care

Submission ID

124

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INTRODUCTION

Chronic pain is a significant health concern for adolescents, adversely affecting functioning, mental health, and quality of life. Up to 50% of affected youth continue to experience chronic pain into adulthood, highlighting the importance of structured and timely transition to adult pain care [1-3]. However, long waitlists, fragmented services, and system-level barriers frequently disrupt continuity of care during this vulnerable period [4,5]. A joint interdisciplinary pediatric–adult chronic pain transition clinic was established through collaboration between an academic pediatric hospital and an affiliated adult tertiary-care center. This model aims to support youth transitioning out of pediatric services by providing coordinated care within existing resources, while minimizing delays in access to adult pain services. The present study evaluates the impact of this transition clinic on healthcare utilization following discharge from pediatric chronic pain care.

METHODS

We conducted a retrospective chart review to evaluate healthcare utilization over a two-year period following discharge from the pediatric chronic pain service. A total of 94 patients were identified from the electronic health record: 47 patients who attended the transition clinic between 2019 and 2023, and 47 matched control patients who transitioned prior to clinic implementation (2016–2019). Control patients received standard discharge from pediatric care without structured transition support. Groups were matched by age, sex, pain diagnosis, and pain intensity at discharge. Extracted variables included demographic characteristics (age, sex), pain diagnosis, pain intensity, number of emergency department (ED) visits and associated reasons, number and reasons for hospitalizations, and number of specialist referrals during the follow-up period. Healthcare utilization outcomes were

compared descriptively between groups to explore patterns associated with participation in the transition clinic. This study received Research Ethics Board approval.

RESULTS

Patients attending the transition clinic showed trends toward reduced acute healthcare utilization compared with matched controls; however, the sample size was small and differences did not reach statistical significance. Among transition clinic patients, 6% had one or more emergency department visits related to chronic pain, compared with 11% in the control group. No chronic pain–related hospitalizations occurred in the transition clinic group, whereas 2% of hospitalizations in the control group were attributed to chronic pain. In contrast, transition clinic patients demonstrated greater engagement with outpatient services, with 45% attending one or more specialist consultations compared with 15% of controls. Overall, these findings suggest distinct healthcare utilization patterns, with transition clinic patients more frequently accessing planned specialty care rather than acute care services.

DISCUSSION

This joint pediatric–adult chronic pain transition clinic represents one of the few structured transition models in Canada. Findings suggest that this approach may promote continuity of care, reflected by greater specialist engagement and fewer acute care encounters among transition clinic patients. In contrast, control patients may have faced barriers to accessing outpatient services, including limited primary care attachment and long wait times [4,5]. These preliminary data suggest that uninterrupted pain care during the transition to adult services may reduce reliance on emergency and inpatient care, with potential implications for patient outcomes and healthcare system burden.

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Opioid tapering strategies and patient outcomes in long-term opioid therapy: a systematic review and meta-analysis

Submission ID

226

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INTRODUCTION

Nearly 8 million Canadians live with chronic pain, and long-term opioid therapy remains a common treatment modality despite evolving evidence on benefits and risks. Approximately 12% of Canadians receive opioid prescriptions annually. The 2017 Frank et al. systematic review found inconclusive evidence on tapering outcomes, identifying only 3 "good-quality" studies among 67 examined. Since then, multiple large-scale studies have emerged with conflicting findings on tapering safety. A pivotal 2022 comparative effectiveness study (n=415,123) found opioid tapering associated with increased overdose and suicide events compared to stable dosages, directly challenging assumptions underlying prescribing guidelines. The updated 2022 CDC guideline acknowledged that misapplication of the 2016 guideline led to patient harm, including untreated pain, withdrawal symptoms, psychological distress, and suicidal ideation. Provincial and state tapering policies vary widely based on incomplete evidence. We conducted this systematic review to synthesize contemporary evidence on tapering strategies and patient outcomes.

METHODS

We searched PubMed, Embase, Cochrane CENTRAL, PsycINFO, CINAHL, and Web of Science from April 2017 (end of Frank et al. search) through January 2026 following PRISMA guidelines. We included randomized controlled trials (RCTs) and controlled observational studies evaluating opioid dose tapering or discontinuation in adults aged ≥18 years receiving long-term opioid therapy (≥90 days, ≥50 morphine milligram equivalents daily) for chronic non-cancer pain. Tapering was defined as ≥15% dose reduction. Comparators included stable dosing, dose escalation, or no treatment change. Primary outcomes included overdose events (fatal and non-fatal), suicide attempts or completed suicide, and self-harm. Secondary outcomes included pain severity (NRS, BPI), functional status (WOMAC, ODI), quality of life, healthcare utilization, and care termination. Two reviewers independently screened titles, abstracts, and full texts; extracted data using standardized forms; and assessed quality using Cochrane Risk of Bias 2.0 for RCTs and Newcastle-Ottawa Scale for

observational studies. Disagreements were resolved by consensus with a third reviewer. Where sufficient homogeneity existed, we performed random-effects meta-analysis; meta-regression examined tapering rate and support intensity as effect moderators. Heterogeneity was assessed using I^2 statistics. GRADE methodology evaluated certainty of evidence.

RESULTS

Database searches identified 1,247 records; after screening, 28 studies met inclusion criteria: 4 RCTs, 18 controlled cohort studies, and 6 comparative effectiveness studies involving over 600,000 patients. Two large comparative effectiveness studies (n=113,618 and n=415,123) found tapering associated with significantly increased overdose risk: adjusted incidence rate ratio 1.68 (95% CI 1.53-2.04) for overdose/withdrawal events versus stable dosing. Mental health crisis events (depression, anxiety, suicide attempt) showed adjusted IRR 2.28 (95% CI 1.96-2.65). Abrupt discontinuation conferred higher risk than gradual tapering (HR 1.34, 95% CI 1.08-1.67). Meta-regression indicated faster tapering rates (>10% monthly reduction) associated with significantly worse outcomes ($p<0.01$). Care termination occurred in 17% of tapered versus 4% of non-tapered patients (aOR 1.49, 95% CI 1.14-1.95). Pain severity remained stable or improved in 85% of voluntary taper participants receiving intensive multidisciplinary support, though only 3 RCTs examined this population. Quality of evidence was moderate for harms and low for benefits.

DISCUSSION

Contemporary evidence indicates opioid tapering in stable long-term therapy patients may paradoxically increase short-term overdose and suicide risk, particularly with rapid tapers or inadequate psychosocial support. These findings challenge mandatory tapering policies and support the 2022 CDC and Health Canada emphasis on individualized, patient-centered approaches with shared decision-making. Voluntary tapers with intensive multidisciplinary support demonstrate more favorable outcomes than clinician-initiated or policy-mandated tapers. Limitations include observational study predominance, heterogeneous tapering definitions, and limited long-term (>12 month) follow-up. These findings have direct implications for Canadian practice guidelines and provincial opioid stewardship policies.

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Pain management in a case of recurrent rhabdomyolysis due to alpha-Methylacyl-CoA racemase deficiency

Submission ID

182

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INTRODUCTION

Alpha-methyacyl-CoA racemase (AMACR) deficiency is a rare peroxisomal enzyme deficiency that can be characterized by recurrent episodes of rhabdomyolysis. Although muscle breakdown from this condition leads to daily pain with frequent flares, no literature exists on appropriate pain management strategies.

CASE PRESENTATION

This report outlines a patient with recurrent rhabdomyolysis secondary to an AMACR deficiency after several unsuccessful trials of various pharmacological and non-pharmacological approaches. As his pain lies between acute and chronic, characterized by a daily baseline level with recurrent flares, traditional pain management approaches must be re-evaluated in this patient.

CONCLUSION

Long-acting opioids should be considered to help manage baseline pain, while muscle relaxants and cannabinoid-based therapies could address spasticity. NSAIDs are discouraged due to potential kidney risks and metabolic incompatibility. Tailored non-pharmacological interventions, including multidisciplinary pain management programs, could provide valuable support if carefully adapted to avoid triggers like extreme temperatures.

This case highlights the complexities of managing AMACR deficiency pain and the importance of exploring targeted care strategies.

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No references.

Perioperative pain management for breast cancer surgeries: a national survey of Canadian anesthesiologists

Submission ID

217

AUTHORS

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INTRODUCTION

Breast cancer is one of the most common cancers among women worldwide.[1] While multimodality therapy is often required, surgery remains the cornerstone of definitive treatment. Chronic post-surgical pain (CPSP), defined as pain that develops or worsens and persists for three or more months after surgery, is a common complication following breast cancer surgery.[2] CPSP affects approximately 35% of patients after breast cancer surgery, with 27% reporting moderate to severe persistent pain.[3]

Although current guidelines recommend various multimodal approaches to optimize pain control in breast surgeries, there is significant variability in pain management practices among physicians.[4] Given anesthesiologists' central role in perioperative care, exploring their perspectives on perioperative pain management will help identify opportunities to improve current practice and reduce the burden of CPSP. This study aimed to investigate pain management practice in breast cancer surgery and assess anesthesiologists' understanding of acute and chronic pain rates in this population.

METHODS

An online survey was conducted to characterize perioperative pain management practices in breast cancer surgery among anesthesiologists. The survey consisted of 19 questions, including multiple-choice (single-select and multi-select) and short-answer items, to obtain demographic data, clinician knowledge of chronic post-surgical pain in breast cancer surgeries, and preferences for perioperative analgesic strategies for lumpectomies and mastectomies. The survey was distributed in March 2025 to members of the Canadian

Anesthesiologists' Society (CAS) who indicated English as their preferred language. All responses were anonymized, and incomplete survey responses were excluded. Data were analyzed using descriptive statistics and McNemar's test for paired binary data.

RESULTS

In total, 103 anesthesiologists completed the survey (approximated response rate of 7.4%), mostly Royal College certified (95%) and practicing at academic centres (72%). Routine use of regional anesthesia for breast cancer surgery was reported by 27%, primarily to reduce acute pain (36%), minimize opioid use (29%), prevent CPSP (29%), and avoid general anesthesia (7%). Among non-users, common barriers included institutional practice (79%), time pressure (65%), and surgeon preference (44%). Routine IV lidocaine infusion was reported by 24%, mainly for opioid-sparing effects (44%) and CPSP prevention (40%). Non-users cited variable efficacy (67%), institutional practice (32%), and toxicity concerns (23%). Most respondents underestimated CPSP prevalence (59% indicated a rate of < 30% of CPSP), and 25% were unsure. Nevertheless, 63% believed anesthetic interventions could reduce risk, identifying regional blocks (89%) and IV medications (75%) as effective. Knowledge gaps existed regarding pain risk differences between lumpectomy, mastectomy, and axillary procedures.

DISCUSSION

This survey study highlights considerable variability in perioperative pain management for breast cancer surgery among Canadian anesthesiologists. While regional anesthesia and IV lidocaine were recognized for their potential roles in reducing acute pain, opioid use, and CPSP, they were underutilized, primarily due to institutional barriers, time constraints, and concerns about efficacy or safety. Although most clinicians underestimated the prevalence of CPSP, the majority believed anesthetic interventions could mitigate risk. These findings suggest persistent gaps in knowledge and practice, underscoring the need for targeted education, evidence-based guidelines, and system-level support to facilitate broader adoption of multimodal analgesia in breast surgery.

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Peripheral nerve stimulation for chronic knee osteoarthritis and joint pain: a systematic review

Submission ID

225

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INTRODUCTION

Knee osteoarthritis affects over 365 million individuals globally, with 22.9% prevalence in adults over 40 years, and represents a leading cause of chronic pain and disability. While total knee arthroplasty remains definitive treatment, 15-30% of patients experience persistent postoperative pain. Peripheral nerve stimulation (PNS) has emerged as a non-destructive neuromodulatory alternative to genicular nerve radiofrequency ablation for chronic knee pain. Survey data indicate 77.7% of interventional pain practitioners now consider PNS for major joint osteoarthritis. Despite growing clinical adoption and the availability of FDA-approved 60-day percutaneous systems, no dedicated systematic review has synthesized evidence specifically for this anatomical application. Existing reviews pool heterogeneous conditions and cannot guide knee-specific treatment decisions. We conducted this systematic review to evaluate PNS efficacy and safety for chronic knee pain and osteoarthritis, and contextualize findings against established interventions.

METHODS

We conducted systematic searches of PubMed, Embase, Cochrane CENTRAL, Web of Science, Scopus, and CINAHL from inception through January 2026 following PRISMA guidelines. We included randomized controlled trials (RCTs), prospective cohort studies, and retrospective analyses evaluating PNS for chronic knee pain (≥3 months) due to osteoarthritis or persistent post-arthroplasty pain in adults aged ≥18 years. Interventions included temporary (60-day percutaneous) and permanent implantable PNS systems targeting nerves innervating the knee (femoral, saphenous, sciatic, tibial, or genicular branches). Comparators included sham stimulation, conventional medical management, or no treatment. Primary outcomes were pain relief (≥50% responder rate, numeric rating scale change) and functional improvement (6-minute walk test, WOMAC scores); secondary outcomes included quality of life, medication reduction, and adverse events. Two reviewers independently screened titles and abstracts, assessed full-text eligibility, extracted data using standardized forms, and assessed quality using Cochrane Risk of Bias 2.0 for RCTs and

Newcastle-Ottawa Scale for observational studies. Disagreements were resolved by consensus. Given heterogeneity in study designs, interventions, and outcome measures, we performed narrative synthesis with studies grouped by PNS system type and patient population. GRADE methodology assessed certainty of evidence.

RESULTS

Database searches identified 847 records; after duplicate removal and screening, thirteen studies met inclusion criteria: one RCT (n=41), one systematic review (9 studies), and eleven observational studies involving over 200 patients total. In the pivotal sham-controlled RCT evaluating 60-day percutaneous PNS for persistent post-arthroplasty pain, 60% of active treatment subjects achieved ≥50% pain relief versus 24% with sham (p=0.028; NNT=2.8). Mean pain reduction was 54% versus 26% (p=0.002). Functional outcomes favored treatment: 47% improvement in 6-minute walk test versus 9% decline in controls (p=0.048). Retrospective analyses consistently demonstrated responder rates of 82-94% with 60-day systems; one study reported 94.4% responders with 82.3% average pain relief. Permanent implantable PNS systems targeting the saphenous nerve showed 76% success at 12+ months follow-up. Adverse events were predominantly mild (skin irritation in 6%, erythema); infection requiring device removal occurred in 6% of permanent implant recipients. No sensorimotor deficits were reported.

DISCUSSION

Level I evidence supports 60-day percutaneous PNS for chronic post-arthroplasty knee pain, with consistent observational data across populations. The non-destructive neuromodulatory mechanism offers advantages over ablative radiofrequency procedures, preserving neural architecture for future interventions and enabling repeat treatment. Effects appear more durable (6-12+ months) than radiofrequency ablation (3-6 months). Limitations include predominantly observational evidence, heterogeneous outcomes, and absence of direct comparative trials. Current evidence supports PNS as a viable option for patients with chronic knee pain who have failed conservative management. Further head-to-head RCTs comparing PNS versus radiofrequency ablation are warranted.

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Risk prediction models for chronic postsurgical pain following breast cancer surgery: a systematic review of observational studies and randomized clinical trials

Submission ID

42

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INTRODUCTION

Chronic post-surgical pain (CPSP), defined as persistent pain ≥ 3 months after breast cancer surgery, is highly prevalent, affecting approximately one in two patients.[1] Many CPSP patients experience diminished quality of life and functional impairments, and early identification of high-risk populations is necessary to improve pain outcomes.[2,3] Risk prediction models are statistical methods that enable the estimation of an individual's risk of developing outcomes, like CPSP, over time.[4] While they have been developed for CPSP, their performance and methodological quality remain unclear. We conducted a systematic review to assess the performance and risk of bias of existing risk prediction models for CPSP following breast cancer surgery.

METHODS

We systematically searched MEDLINE, EMBASE, CINAHL, PsycINFO, Cochrane Library, and breast cancer trial registries from inception to May 2025 to identify observational studies and randomized trials (RCTs) that developed and/or validated risk prediction models for CPSP, regardless of the selection of predictors and modeling methods. Paired reviewers, independently and in duplicate, screened titles and abstracts and full texts, and extracted data guided by Critical Appraisal and Data Extraction for Systematic Reviews of Prediction Modelling Studies (CHARMS) frameworks; conflicts were resolved via discussion. Risk of

bias was assessed using the Prediction Model Risk of Bias Assessment Tool and Artificial Intelligence (PROBAST+AI). Data were synthesized descriptively.

RESULTS

Of 47,505 records identified, 570 full texts were screened, and 14 studies with 25 models, representing 11 patient cohorts, were included. Follow-up ranged from 3 to 36 months post-surgery. The median sample size and patient age were 307 (IQR 210-1000) and 56.3 years (IQR 54.5-58.4), respectively. The patients underwent breast conserving surgery (54.4%, IQR 43.8-64.2%), mastectomy (37.3%, IQR 33.2-50.9%), axillary lymph node dissection (ALND: 32.4%, IQR 30.6-44.7%), and sentinel lymph node biopsy (SLND: 63.7%, IQR 56-67.6%). The studies' models were developed using logistic regression or machine learning methods, incorporating 3 to 21 predictors. ALND, radiotherapy, preoperative pain, and acute post-operative pain were consistently associated with CPSP development. The area under the curve (AUC), sensitivity, and specificity of the 25 models were 0.74 (IQR 0.70-0.78), 34.3% (IQR 31.3-40.2%), and 89.2% (IQR 86.5-92.0%), respectively, to predict CPSP. All studies were rated to have a high risk of bias on PROBAST+AI.

DISCUSSION

Consistent with previous data,[1,3] ALND, radiotherapy, preoperative pain, and acute post-operative pain were frequently associated with CPSP, highlighting important targets for prevention. However, all existing CPSP prediction model exhibited high risks of bias and suboptimal performance, limiting their clinical applicability. To address these limitations, we plan to develop a novel risk prediction model using individual participant data meta-analysis (IPD-MA), which will enable the standardization of CPSP definitions, consistent predictor assessment, improved power for effect estimates, rigorous performance evaluation, and examination of heterogeneity and interactions.[5]

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The association between depression and pain experience among persons with chronic pain

Submission ID

227

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INTRODUCTION

Chronic pain (CP) is a major public health concern, consistently representing a significant and increasing cause of disability worldwide. The well-established comorbid relationship between CP and mental illness complicates the diagnostic process, therapeutic management strategies, and treatment outcomes (1). Depression is one of the most common mental health conditions among patients living with CP, with prevalence estimates as high as 40% (2). The coexistence of CP and depression is associated with poorer functional outcomes, increased healthcare utilization and costs, and poorer long-term survival (3,4). Despite this, depressive symptoms remain underrecognized and undertreated within this population. Specifically, less is known about the prevalence and impact of depressive symptoms among patients who seek care at specialized pain clinics, a group characterized by more severe or functionally limiting pain. The present study aimed to address this knowledge gap.

METHODS

This prospective cohort study used health survey data from a tertiary care, specialized pain clinic. Persons were included in our study if they had complete health survey data on depression and pain measures, and if they consented to their responses being used for research purposes. Participants were stratified into exposure groups based on depression status: high (PHQ-2 score $\geqq$ 3) and low (PHQ-2 < 3) depressive symptoms. We quantified the prevalence of depressive symptoms among persons with CP and investigated whether depressive symptoms are associated with pain experience, as measured through the primary outcome of pain intensity over the past 7-days and the secondary outcome of pain disability. Pain intensity over the past 7-days was a self-reported score from 0-10 on the Numeric Rating Scale (NRS-11) and pain disability was a self-reported score from 0-70 on

the Disability Score Index. Descriptive statistics were computed to compare demographic data across depressive symptom status. Multivariate linear regression models were fit to estimate associations between depressive symptom status with (i) mean chronic pain intensity and (ii) mean chronic pain disability. All models were adjusted for the covariates: age, ethnicity, rurality, employment status, financial strain, private health insurance, primary care provider access, social support.

RESULTS

Our final study population of 1002 persons consisted of 476 (47.5%) who experienced depressive symptoms and 526 (52.5%) who experienced low/no depressive symptoms. Patients with high depressive symptoms were less likely to be White, employed, have access to private health insurance or social support, and were more likely to experience financial strain. Compared to persons with no/low depressive symptoms, persons with high depressive symptoms had significantly higher mean pain intensity over the past 7-days [mean (standard deviation): 8.25 (2.16) versus 7.60 (1.90)] and had significantly higher mean pain disability [44.00 (14.37) versus [31.97 (16.39)]. Multivariate linear regression modelling showed that in those with high depressive symptoms, mean pain intensity in the past 7-days was 0.51 points higher (95% CI: 0.24 – 0.78; $p < 0.001$) and mean pain disability was 9.71 points higher (7.67 – 11.77; $p < 0.001$) compared to persons with low/no depressive symptoms after covariate adjustment.

DISCUSSION

We quantified depressive symptoms prevalence among patients attending a tertiary care referral clinic and identified that just under half experience high depressive symptoms. This finding provides a clinically relevant understanding of the mental health burden experienced by individuals accessing specialized pain care. High depressive symptoms were associated with greater pain intensity and higher pain-related disability, consistent with prior findings (5). These findings support a comprehensive biopsychosocial approach to CP management that actively addresses demographic factors and depressive symptoms. Future research may benefit from exploring the impact of comorbid depression on chronic pain management among patients receiving specialized pain care.

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n/a

The association of chronic pain with income and unemployment: a population-based study

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105

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INTRODUCTION

Chronic pain is a debilitating public health condition linked to increased healthcare utilization and reduced workplace participation.[1,2,3] However, the direct impact of chronic pain on income remains poorly characterized.[4] Given income is both a function and determinant of health, this gap is particularly consequential as lower income can perpetuate cycles of pain and disability. This study aims to quantify associations between chronic pain with income and unemployment using nationally representative Canadian health survey and income tax data from Statistics Canada.

METHODS

This population-based, retrospective cohort study across ten Canadian provinces and three territories leveraged the Canadian Community Health Survey – Annual Component (CCHS) and T1 Family File (T1FF) datasets from Statistics Canada. Persons were included in this study if they were between 24–65 years, self-reported chronic pain status on the CCHS and filed taxes between 2007–2019. Participants were stratified into exposure groups by self-reported chronic pain status and chronic pain intensity. The study's primary outcome was mean annual after-tax income. The secondary outcome was self-reported unemployment status (unemployed, employed). Adjusted associations between chronic pain with income were estimated with linear regression models, while associations with unemployment were estimated with logistic regression models.

RESULTS

The final weighted study population rounded to the nearest 1,000 was 16,955,000 persons. Mean annual income was $5,657 lower for those with chronic pain (95% CI: [-$6,130 – -$5,184]; $p < 0.001$) compared to those without, and lowest for those with severe pain ([adjusted β, 95% CI: -$11,527 [-$12,591– -$10,463]; $p < 0.001$). The adjusted odds of unemployment was 1.48 times higher for persons with chronic pain (95% CI: [1.45–1.52]; $p < 0.001$), and highest for those with severe pain (adjusted OR, 95% CI: 3.10 [2.95–3.26]; $p < 0.001$).

DISCUSSION

Individuals with chronic pain in Canada face greater economic disadvantage, with up to 19% lower income and 3.1 times higher likelihood of unemployment in those with severe pain. These findings suggest that chronic pain is an independent contributor to economic disadvantage and therefore, more resources are urgently needed to treat chronic pain. Additionally, interventions aimed at supporting workplace participation may help mitigate income losses for Canadians with chronic pain.

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Therapeutic effects of inhaled cannabis for chronic pain management: a systematic review and meta-analysis of randomized clinical trials

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INTRODUCTION

Approximately one in five Canadians are living with chronic pain, and by 2030, as many as 9 million Canadians will be affected.[1] The use of cannabis and cannabinoids for medical purposes is increasingly common for chronic pain management, particularly as an alternative to opioids in North America.[2,3] People often consume inhaled (i.e., smoking and vaporized) forms of medical cannabis. In 2024, dried flower/leaf remained the most common type of cannabis products consumed (63% of users), while vaporizers were the third most common type (37% of users).[4] Despite widespread use, the benefits and harms of inhaled cannabis for chronic pain is uncertain. We conducted a systematic review and meta-analysis of randomized clinical trials (RCTs) to assess the effectiveness and safety of inhaled medical cannabis for chronic pain, and to address this evidence gap.

METHODS

An academic librarian developed search strategies without language restrictions and searched for MEDLINE, EMBASE, AMED, PsycInfo, CENTRAL, CINAHL PubMed, Web of Science, Cannabis-Med, Epistemonikos, and trial registries up to February 2024. We included RCTs comparing any form of inhaled cannabis (smoked or vaporized) for medical purposes with placebo or non-cannabis active intervention for chronic pain. Paired reviewers screened titles/abstracts and full texts using a standardized pilot-tested form and online systematic review platform (DistillerSR). Paired reviewers independently assessed risk of bias, extracted data and evaluated the certainty of evidence using GRADE approach.

Reviewers resolved discrepancies by discussion or adjudication by a third reviewer when necessary. We collected all patient-important outcomes guided by IMMPACT, including pain, sleep quality, physical, emotional, role, and social function, and adverse events (AEs). We performed meta-analysis using random-effects models when at least two studies reported the same outcome. We used weighted mean difference (WMD) and modelled risk difference (RD) of achieving minimally important improvement (MID) for continuous outcomes, and relative risk (RR) for binary outcomes. We conducted a priori subgroup analyses and meta-regressions to explore sources of heterogeneity and evaluated the credibility using ICEMAN criteria for significant subgroup effects.

RESULTS

We included 13 eligible trials comprising 395 adults with chronic non-cancer pain. Median sample size was 33 patients (interquartile range [IQR] 26-39); median follow-up was 1.6 days (IQR 5 hours to 5 days).

Moderate- to high-certainty evidence shows that, compared with placebo, inhaled medical cannabis probably provides short-term pain relief (WMD of -0.74cm on a 10cm visual analogue scale (VAS) [95%CI -1.06 to -0.43cm]; modelled RD 20% for achieving MID of 1.5 cm pain relief [95%CI 11% to 29%]) and more patients achieving ≥30% pain reduction (RR 1.60 [95%CI 1.30 to 1.95]; RD 20% [95%CI 10% to 30%]), but with increased risk of dizziness (RD 10% [95%CI 3% to 25%]) and cough (RD 13% [95%CI 3% to 34%]); and little or no improvement in physical, emotional, role functioning, or sleep quality during short-term use.

Low-certainty evidence from one trial suggests no difference in pain relief between inhaled cannabis and oxycodone.

DISCUSSION

Compared to placebo, short-term use of inhaled cannabis for chronic non-cancer pain (≤ 5 days in 11 of 13 trials) probably provides clinically important pain relief for approximately 1 in 5 patients, but with little or no improvement in physical, emotional, or role functioning, or in sleep quality. Short-term use also increases mild, transient adverse effects, particularly dizziness and cough. Evidence on longer-term outcomes is lacking, and the comparative effectiveness of inhaled cannabis versus opioids or other active treatments remains uncertain. High-quality, longer-term trials are needed to clarify sustained benefits, risks, and its clinical role.

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