ISSN 0008-3194 (p)/ISSN 1715-6181 (e)/2025/348–364/$2.00/©JCCA 2025

Routine medical care for adults with musculoskeletal disorders in the Indigenous community of Pimicikamak, northern Manitoba before and after implementing the Global Spine Care Initiative model: a retrospective chart review with a 10-month post-implementation window.

A collaborative research project between World Spine Care Canada (WSCC), Pimicikamack Okimawin, and Cross Lake Nursing Station

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Conflicts of Interest and Funding:
The authors have no disclaimers or competing interests to report in the preparation of this manuscript. This work was supported by Health Canada Substance Use and Addictions Program (agreement # 2223 HQ 000126), The Canadian Chiropractic Research Foundation (CCRF), The Canadian Chiropractic Association (CCA), Healthcare Excellence Canada, and The Skoll Foundation.

Background: *Indigenous communities in northern Manitoba face a high burden of musculoskeletal (MSK) conditions and limited access to care. In October 2023, a new chiropractic service was launched in Cross Lake, Manitoba, aiming to improve MSK care access. This study explored: (1) the nature of MSK-related care provided at the Cross Lake Nursing Station, and (2) changes in clinical management during the first 10 months post-implementation.*

Methods: *We conducted a retrospective chart review (standardized 14-item form) for two periods: December 2021–2022 (pre-implementation) and October 2023–August 2024 (post-implementation). Data on presentations, imaging, treatments, and referrals were analyzed descriptively.*

Results: *Post-implementation, imaging use declined (63.4% to 44.9%), as did prescription of NSAIDs (80.5% to 53.1%), acetaminophen (63.4% to 32.7%), and opioids (21.9% to 8.2%). Muscle relaxant prescriptions increased, while pregabalin/gabapentin remained stable.*

Conclusion: *The new chiropractic service may be associated with reduced use of imaging and common medications for MSK conditions.*

(JCCA. 2025;69(4):348-364)

KEY WORDS: musculoskeletal; spine care; retrospective chart review; medically underserved area; chiropractic; non-pharmacological; Indigenous; opioid

Les soins médicaux de routine pour les adultes atteints de troubles musculo-squelettiques dans la communauté autochtone de Pimicikamak, dans le nord du Manitoba, avant et après la mise en œuvre du modèle du Global Spine Care Initiative model: un examen rétrospectif des dossiers avec une période d'observation de 10 mois après la mise en œuvre. Un projet de recherche collaboratif entre World Spine Care Canada (WSCC), Pimicikamack Okimawin et la Station de soins infirmiers de Cross Lake

Contexte: *Les communautés autochtones du nord du Manitoba font face à un fardeau élevé de conditions musculo-squelettiques (MSK) et à un accès limité aux soins. En octobre 2023, un nouveau service de chiropratique a été lancé à Cross Lake, au Manitoba, visant à améliorer l'accès aux soins musculo-squelettiques. Cette étude a exploré : (1) la nature des soins liés aux conditions MSK fournis à la station de soins infirmiers de Cross Lake, et (2) les changements dans la gestion clinique au cours des 10 premiers mois suivant la mise en œuvre.*

Méthodes: *Nous avons réalisé un examen rétrospectif des dossiers (formulaire standardisé de 14 éléments) pour deux périodes : Décembre 2021–2022 (avant la mise en oeuvre) et octobre 2023–août 2024 (après la mise en oeuvre). Les données sur les présentations, l'imagerie, les traitements et les références ont été analysées de manière descriptive.*

Résultats: *Après la mise en œuvre, l'utilisation d'imageries a diminué (de 63,4 % à 44,9 %), tout comme la prescription d'anti-inflammatoires non stéroïdiens (de 80,5 % à 53,1 %), d'acétaminophène (de 63,4 % à 32,7 %) et d'opioïdes (de 21,9 % à 8,2 %). Les prescriptions de relaxants musculaires ont augmenté, tandis que celles du pregabalin/gabapentin sont restées stables.*

Conclusion: *Le nouveau service de chiropratique pourrait être associé à une réduction de l'utilisation d'imageries et de médicaments courants pour les conditions musculo-squelettiques.*

(JACC. 2025;69(4):348-364)

MOTS CLÉS : musculosquelettique; soins de la colonne vertébrale; examen rétrospectif des dossiers; zone médicalement mal desservie; chiropratique; non pharmacologique; autochtone; opioïde

Introduction

Musculoskeletal (MSK) disorders, including back and neck pain, affect over 1.7 billion people globally and have been the leading cause of disability since 1990.[1] Spine-related disorders disproportionately impact disadvantaged populations, including individuals living in poverty, rural communities, women, and older adults.[2] Without access to appropriate care, these conditions can lead to reduced mobility and poor overall health, with cascading effects including social isolation, diminished work capacity, and poverty.

Spine complaints are among the most common reasons for people to seek care from their primary care clinicians and account for nearly half of all opioid prescriptions.[1-5] Central to the problem is the prevalent use of low-value care-interventions with minimal or no evidence for benefits relative to their potential harm, costs, or healthcare burden.[6] For example, patients with acute low back pain (LBP) who receive diagnostic imaging, opioid prescriptions, and specialist referrals within 6 weeks of the initial visit are more than twice as likely to develop chronic pain than those receiving no such care.[7,8] Similarly, prescribing opioids for non-specific LBP is linked to prolonged work disability, increased medical costs, and higher surgical rate.[7,8]

Systemic and contextual factors contribute to the overuse of low-value spine care, including limited access to non-pharmacologic alternatives, financial barriers, patient expectations, practitioner beliefs, and healthcare systems oriented toward a biomedical care approach.[9-11] In contrast, international clinical guidelines for non-specific LBP recommend emphasizing patient education, staying active, advice on self-care, and home and/or group exercise as first-line treatment.[12] While discouraging passive modalities, the guidelines do recommend therapies like massage, acupuncture, and manual therapy, with a short course of non-steroidal anti-inflammatory drugs (NSAIDs) as secondary care options. Routine use of acetaminophen (paracetamol), skeletal muscle relaxants, antidepressants, anticonvulsants/antiepileptics, opioids and spinal injections for non-specific spine pain are discouraged. Multidisciplinary treatment and psychological therapy may be considered for specific subgroups at risk of delayed recovery.[12-21] Despite the evidence, the uptake of these guidelines in primary care remains suboptimal.[22,23]

World Spine Care (WSC) is a group of four organizations incorporated as not-for-profit charities in their relevant jurisdictions dedicated to bridging the gap in evidence-based treatment for spinal conditions in underserved regions (https://www.worldspinecare.org/). Their mission is to improve the lives, functionality, and participation of individuals living in these communities.[24] To advance this mission, WSC established the Global Spine Care Initiative (GSCI), a multiphase project to develop and implement an evidence-based, culturally adapted, and sustainable model of care (MoC) for spine-related conditions.[25,26] The GSCI MoC incorporates triage tools and care pathways tailored to low-resource settings with limited or no access to spine care.[27,28]

While the GSCI MoC has been applied in WSC clinics in various international settings, the current study marks the first implementation study in a remote Canadian Indigenous community.[29] In partnership with Pimicikamak Okimawin leadership, WSC Canada introduced a chiropractic service in Cross Lake, Manitoba in 2023. Cross Lake is located approximately 800 km north of Winnipeg (https://crosslakeband.ca/), with a population of 6,734 on the treaty and 2,715 on the non-treaty land and includes First Nations, Métis and non-Indigenous people.[30] Cree and English are spoken in this community.[31] Prior to this initiative, limited evidence-based, primary-level spine care was available locally.

Context

Indigenous communities in northern Manitoba experience a disproportionately high burden of injuries, acute illness, and chronic disease, in addition to the legacy of colonization and systemic inequities.[32-34] Communities like Cross Lake First Nation face unique barriers to care, including geographic isolation, limited local health infrastructure, and dependence on fly-in nurses, nurse practitioners and medical doctors (MDs) to deliver care at the Cross Lake Nursing Station, some of whom may be unfamiliar with the cultural context and long-term patient needs.[35,36] Specialized spine care is only available in distant urban centres such as The Pas (401 km away), Thompson (255 km away), or Winnipeg (770 km away). Travel to these distant centres is not patient-centric, logistically difficult, financially burdensome, and often not fully covered by the provincial health system.

To address this critical gap and remove geographic

and financial barriers to evidence-based spine care, WSC Canada introduced a community-based spine care service, co-designed with Pimicikamak leadership to ensure the delivery of culturally relevant care within the existing healthcare system.[29] The service, launched on October 5, 2023, is delivered at the Cross Lake Nursing Station by licensed chiropractors up to three days per week. The proximity to other medical services allows for close interaction with other health care providers. The service is free of charge and can be accessed directly, or through referral from various professionals, namely MDs (northern family medicine physicians and emergency physicians), nurses, and mental health counsellors at the Cross Lake Nursing Station. In July 2023, the WSC clinicians provided formal education to MDs and nursing staff on the application of the GSCI triage and care pathways.[27,28] They also engaged in informal discussions regarding current recommendations from up to date international evidence-based guidelines on the management of spinal pain as outlined by the GSCI[21,37,38] and the World Health Organization[12].

The overarching goal of this study was to evaluate the potential clinical impact of integrating the GSCI MoC in the community in collaboration with local guidance and feedback.[29,39,40] The current study aimed: 1) to describe the nature of routine MSK care delivered to adults by northern family medicine physicians, nurses and nurse practitioners at the Cross Lake Nursing Station over the previous year, and 2) to compare diagnostic imaging use and patient management – including pharmaceutical, non-pharmaceutical treatments, and referrals—before and after the implementation of the new chiropractic service.

Methods

Ethics and Agreements

A research agreement (Pimicikamak Okimawin leadership, World Spine Care, University of Manitoba and Université du Québec à Trois-Rivières) was signed on July 7, 2022, and a data transfer agreement (The Global Spine Care Initiative, Health and Welfare Canada Cross Lake Nursing Station) was signed on August 22, 2022. Ethical approval was obtained from the University of Manitoba's Research Ethics Board (#HE2022-0249).

Design and population

We conducted a retrospective pilot medical chart review of a sample of adults (≥18 years) who presented to the Cross Lake Nursing Station with a primary complaint of musculoskeletal (MSK) pain. A sample size calculation determined that 68 participants were needed for a population of 9,400, with a 90% confidence interval and a 10% margin of error for this exploratory study; given operational constraints, we proceeded with a convenience sample appropriate to this exploratory study.

Data collection procedures

A standardized 14-item data extraction form was developed (Appendix 1), adapted from the GSCI's spine care pathway and clinical flashcards[27,28] used in previous WSC-affiliated clinic. The form was used to collect information on patients' demographics (age, gender), clinical presentation (pain location: lumbar, thoracic, cervical, extremity; duration: acute, chronic; intensity: 0-10 scale; onset: traumatic, gradual), history (first and second episodes of MSK pain; visits related to back and neck pain; function limitations: work, activities of daily living), and care provided (use of diagnostic imaging: radiographs, advanced imaging; prescribed and non-prescribed medication: NSAIDs, non-opioid, other, and opioid medication; non-pharmacological care: physiotherapy, massage, other; patient referrals). The items were reviewed and refined based on team feedback and piloted on the first 10 charts before full implementation, and data incorporated after these were re-reviewed.

Participants were identified through two recruitment methods: 1) Adults with complaints of spinal symptoms or extremity pain who called the Cross Lake Nursing Station for an appointment or were seen by MDs and/or nurses either in the Nursing Station medical clinic or emergency department, were informed of the study and asked for permission to be contacted; and 2) a community Facebook notice inviting eligible individuals to contact the research team. The service was co-designed with Pimicikamak leadership to enhance cultural relevance.

All participants voluntarily provided informed consent, allowing access to their medical records. Two local research assistants retrieved paper-based records for both emergency and scheduled visits. Data extraction was completed by two licensed chiropractors in December 2022 (pre-implementation: December 2021–December 2022) and in August 2024 (post-implementation: October 2023–August 2024). All data were de-identified by the data extractors and entered into a secure digital platform

designed for the study (using JavaScript Object Notation (JSON)) or into an Excel file, with automatic backup to the University of Manitoba's secure server.

Analysis

Descriptive analyses were conducted using SAS v9.4 *(Copyright © 2012-2018, SAS Institute Inc., Cary, NC, USA. SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc., Cary, NC, USA*). Numerical variables were summarized using means and standard deviations, while categorical variables were reported as percentages of the sample endorsing each category. Paired comparison of patients with charts included at both time points was also conducted. Given the exploratory design, convenience sampling, and documentation variability, statistical analysis was limited to descriptive statistics (means, standard deviations, frequencies and percentages) and no inferential hypothesis testing was performed.

Results

Patient Characteristics

Of the 107 patient charts reviewed, 41 were included in the pre-implementation period (mean age=50.9 years, 60.9% self-identified as female), and 49 charts in the post-implementation periods (49.5 years, 67.4% female) (Table 1). The 17 remaining charts were excluded as they did not meet the eligibility criteria (i.e., adults with a primary MSK complaint).

Table 1.
Patient characteristics, presenting complaints, diagnostic imaging, and management.

	Pre-Implementation (n=41) n (%) unless otherwise indicated	Post-implementation (n=49) n (%) unless otherwise indicated	Included in both pre- and post-implementation periods (n=21)	
			Pre-implementation n (%) unless otherwise indicated	Post-implementation n (%) unless otherwise indicated
Gender				
Female	25 (60.9%)	33 (67.4%)	16 (76.2%)	
Male	16 (39.1%)	16 (32.6%)	5 (23.8%)	
Age (years)	50.9 (SD=11.2)	49.5 (SD=12.1)	50.7 (SD=12.0)	
Range	18-70	19-71	18-70	
Onset				
Non-traumatic	36 (87.8%)	38 (77.6%)	19 (90.5%)	18 (85.7%)
Traumatic	5 (12.2%)	11 (22.5%)	2 (9.5%)	3 (14.3%)
Pain location				
• Lumbar	26 (63.4%)	27 (59.2%)	13 (61.9%)	11 (52.4%)
• Thoracic	4 (9.8%)	2 (4.1%)	2 (9.5%)	1 (4.8%)
• Cervical	3 (7.3%)	5 (10.2%)	2 (9.5%)	2 (9.5%)
• Extremities	8 (19.5%)	11 (22.5%)	4 (19.1%)	6 (28.6%)
• Other	0 (0.0%)	2 (4.1%)	-	1 (4.8%)
Pain intensity				
Not reported	32 (78.1%)	41 (83.7%)	16 (76.2%)	16 (76.2%)

	Pre-Implementation (n=41) n (%) unless otherwise indicated	Post-implementation (n=49) n (%) unless otherwise indicated	Included in both pre- and post-implementation periods (n=21)	
			Pre-implementation n (%) unless otherwise indicated	Post-implementation n (%) unless otherwise indicated
Pain duration				
• Acute (< 3 months)	26 (63.4%)	24 (49.0%)	13 (61.9%)	8 (38.1%)
• Chronic (> 3 months)	15 (19.5%)	20 (40.8%)	8 (38.1%)	11 (52.4%)
• Not reported	0 (0.0%)	5 (10.2%)	-	2 (9.5%)
Able to work/ Perform ADLs				
• Yes	24(58.5%)	42 (85.7)	11 (52.3%)	18 (85.7%)
• No	17 (41.5%)	7 (14.3%)	10 (47.6%)	3 (14.3%)
Number of episodes of care for an MSK complaint				
1	32 (78.1%)	40 (81.6%)	15 (71.4%)	15 (71.4%)
2	9 (21.9%)	6 (12.2%)	6 (28.6%)	4 (19.1%)
3	-	3 (6.1%)	-	2 (9.5%)
Number of Visits across episodes				
Range (n)	1 to 24	1 to 24	1 to 24	1 to 5
1	17 (41.5%)	28 (57.1%)	8 (38.1%)	8 (38.1%)
2	7 (17.1%)	11 (22.5%)	3 (14.2%)	7 (33.3%)
3	8 (19.5%)	5 (10.2%)	2 (9.5%)	2 (9.5%)
4	3 (7.3%)	3 (6.1%)	3 (14.3%)	3 (14.3%)
5	1 (2.4%)	1 (2.0%)	-	1 (4.8%)
>5	5 (12.2%)	1 (2.0%)	5 (23.8%)	-
Any Imaging				
• Number of patients	26 (63.4%)	22 (44.9%)	13 (61.9%)	10 (47.6%)
• Number of imaging referrals	33	23	17	13
• Plain film x-rays	20 (48.8%)	12 (14.3%)	9 (42.9%)	6 (28.6%)
• CT scan	5 (12.2%)	4 (8.2%)	3 (14.3%)	1 (4.8%)
• MRI	8 (19.5%)	7 (14.3%)	5 (23.8%)	3 (14.3%)
OTHER				3 (14.3%)
Imaging location	33 imaging referrals	23 imaging referrals	17 imaging referrals	13 imaging referrals
• Local (Cross Lake)	16 (48.5%)	7 (30.4%)	6 (35.3%)	4 (30.8%)
• Remote (Winnipeg, Thomson, Norway House, Winkler)	16 (48.5%)	11 (47.8%)	10 (58.8%)	8 (61.5%)
• Not reported	1 (3.0%)	5 (21.7%)	1 (5.9%)	1 (7.8%)

	Pre-Implementation (n=41) n (%) unless otherwise indicated	Post-implementation (n=49) n (%) unless otherwise indicated	Included in both pre- and post-implementation periods (n=21)	
			Pre-implementation n (%) unless otherwise indicated	Post-implementation n (%) unless otherwise indicated
Non-pharmacological Care	25 (61.0%)	10 (20.4%)	10 (58.8%)	9 (42.9%)
• Patient education, Advice on self-care, applying heat or ice	19 (46.3%)	5 (10.2%)	8 (38.1%)	1 (4.8%)
• Exercise	6 (14.6%)	2 (4.1%)	4 (19.0%)	1 (4.8%)
• Massage therapy	1 (2.4%)	3 (6.1%)	1 (4.8%)	1 (4.8%)
• Assisted device	6 (14.6%)	2 (4.1%)	3 (14.3%)	1 (4.8%)
• Chiropractic Care	----------	6 (12.2%)	----------	5 (23.8%)
Pharmacological care	31 (75.6%)	30 (61.2%)	17 (81.0%)	14 (66.7%)
• Prescription NSAIDs	28 (68.3%)	15 (30.6%)	16 (76.2%)	6 (28.6%)
• Non-Prescription (recommended) NSAIDS	5 (12.2%)	11 (22.5%)	1 (4.8%)	3 (14.3%)
NSAIDS (combined prescribed and non-prescribed)	33 (80.5%)	26 (53.1%)	16 (76.2%)	8 (38.1%)
• Acetaminophen	26 (63.4%)	16 (32.7%)	12 (57.1%)	6 (28.6%)
• Muscle relaxants	3 (7.3%)	7 (14.3%)	2 (9.5%)	3 (14.3%)
• Opioids / Narcotics	9 (21.9%)	4 (8.2%)	6 (28.6%)	2 (9.5%)
• Pregabalin or Gabapentin	5 (12.2%)	6 (12.2%)	3 (14.3%)	4 (19.1%)
• Other (includes sedatives, antidepressants, anti-anxiety, Voltaren gel, capsaicin cream, antibiotics, anti-rheumatics etc.)	13 (31.7%)	11 (22.5%)	5 (23.8%)	6 (28.6%)
Referrals to an outside distant facility	11 (26.8%)	11 (22.4%)	8 (38.1%)	6 (28.6%)
• Physiotherapy	7 (12.5%)	2 (4.1%)	4 (19.1%)	0 (0.0%)
• Medical specialists (orthopedic, rheumatology, neurosurgery)	9 (21.9%)	9 (18.4%)	7 (33.4%)	6 (28.6%)

* Number of imaging referrals can exceed the number of patients imaged because a patient may receive multiple modalities. (Paired pre = 9+3+5 = 17; paired post = 6+1+3 + other 3 = 13).

ADLs = activities of daily living;
PROMs = patient-reported outcome measures;
PREMs = patient-reported experience measures.

The proportion of cases with a traumatic onset increased from 12.2% to 22.5% during the post-implementation period. Low back pain remained the most common complaint across both periods (63.4% pre- vs 59.2% post-), while cases involving neck pain (7.3% to 10.2%) and extremity pain (19.5% to 22.5%) both showed a slight increase. The proportion of patients with chronic pain (duration >3 months) more than doubled, from 19.5% to 40.8%. Pain intensity was reported in approximately 20% of charts in both periods. Most patients presented with a single episode of MSK care (78.1% pre- vs. 81.6% post-) and were seen less than three times by medical staff (MDs or nurses) in both time periods. Interestingly, fewer second episodes of MSK care were noted post-implementation (21.9% vs. 12.2%).

Imaging Utilization

Overall, imaging rate declined from 63.4% to 44.9% post-implementation. This included a reduction in plain film radiography (48.8% to 14.3%), CT scans (12.2% to 8.2%), and MRIs (19.5% to. 14.3%).

Patient Management

Non-Pharmacological Care

Recommendations (from MDs and nurses) for non-pharmacological interventions declined post-implementation, notably for patient education and self-care advice (43.3% to 10.2%), exercise prescriptions (14.6% to 4.1%). Recommendations for manual therapy remained low in both periods.

Pharmacological Care

There was a notable reduction in prescribed NSAIDs (68.3% to 30.6%, although the overall use of NSAIDs showed a lesser decrease from 80.5% to 53.1% when taking over-the-counter NSAIDs into account), acetaminophen (63.4% to 32.7%), and opioids (21.9% to 8.2%). Other medications (e.g., sedatives, antidepressants, anti-anxiety, Voltaren gel, and capsaicin cream) also decreased (31.7% to 22.5%). Conversely, prescriptions for muscle relaxants (7.3% to 14.3%) increased, while prescriptions for Pregabalin or Gabapentin remained unchanged (12.2%).

Referrals

Referrals to external distant facilities decreased from 26.8% to 22.4%. This included medical specialist referrals (21.9% to 18.4%), and physiotherapy referrals (12.5% to 4.1%). Additionally, six new referrals (12.2%) to the onsite WSCC (World Spine Care Canada) chiropractic clinic occurred in the post-implementation period.

Paired comparison of patients with charts included at both time points

Twenty-one patient charts (mean age 50.7 years, 76.2% females) were included in the pre- and post-implementation periods. (Table 1) Among these, the proportion of patients with a chronic complaint increased (38.1% to 52.4%), suggesting conditions transitioned from acute to chronic pain for some patients. Lumbar pain remained the most frequent complaint but declined slightly (61.9% to 52.4%), suggesting either symptom resolution or a change in complaint priority. Extremity complaints increased in the post-implementation period (19.1% to 28.6%), while the proportion of neck and thoracic complaints remained stable. Most patients had only one episode of care across periods (71.4%).

Imaging Utilization

Among patients seen at both time points, imaging ordering (plain film, CT, MRI) decreased in the post-implementation period (61.9% to 47.6%).

Non-Pharmacological Care

Interestingly, fewer patients received patient education and self-care advice (38.1% to 4.8%) or exercise prescriptions (19% vs. 4.8%) from MDs, nurses and nurse practitioners. Referrals for massage remained unchanged (4.8%), while a few referrals (23.8%) were made to the onsite chiropractic clinic.

Pharmacological Care

A decline in the overall prescription of NSAIDS (81% to 38.1%), opioids (28.6% to 9.5%), and acetaminophen (57.1% to 28.6%) was noted post-implementation.

Discussion

In this exploratory retrospective pre–post chart review, after introducing an onsite GSCI-aligned chiropractic service, we observed lower imaging and reduced prescribing of NSAIDs, acetaminophen, and opioids. These associative changes align with prior reports of more guide-

line-concordant care when non-pharmacological options are integrated into primary care teams.[41-43]

Consistent with broader spine care populations,[44] most patients presenting to the Cross Lake Nursing Station identified as female, in their early 50s, reporting non-traumatic low back or neck pain. Across both time periods, most individuals sought care for a single episode and were seen fewer than three times by medical staff, suggesting that MSK complaints were generally managed within a short care window.

Imaging ordered by medical staff declined post-implementation, though rates remained a high considering serious pathology (e.g., cancer, infection) or specific pathology (e.g., spinal canal stenosis, compression fracture)[37, 45, 46] are estimated to be the causes of spinal pain in less than 1% and 10% in the primary care setting, respectively.[47,48,49] While trauma and extremity presentations were relatively more frequent post-implementation, not all such cases warrant imaging; the reduction may reflect increased comfort with non-pharmacological care pathways. Because red-flag documentation was unavailable, appropriateness could not be assessed and should be a focus of future quality improvement study.

While reductions in NSAIDs, acetaminophen, and opioids are consistent with greater availability of non-pharmacological care and staff education[41,42,43], the increased use of muscle relaxants in the post-implementation period warrants monitoring given mixed evidence[50,51]. Notably, gabapentinoid prescriptions remained unchanged, despite limited benefit for back pain with or without sciatica[52-55], and increasing concerns of misuse[56]. We avoid causal inference with these data but note these as pragmatic practice signals. Due to limitations in the available data, co-prescription of opioids and gabapentinoids could not be determined, and suggests an important gap given the increased risk of opioid-related mortality associated with such combinations.[57] Across Manitoba, rising overdose deaths from opioids[58,59] highlights the need for a more holistic approach to pain management specific to substance use interventions and as a public health priority[60]. Despite the evidence against opioid prescription as a first-line treatment for acute or chronic spine pain[61-63], and the ongoing opioid crisis across North America[64], pharmacological options are often more readily accessible than non-pharmacological alternatives, leading to their continued use[65].

Non-pharmacological care and role transition

Charted MDs/nurse delivery of education/exercise declined, possibly reflecting task re-distribution to the on-site chiropractic service. An unpublished report prepared for our funders (Oct 2023–May 2025) describes chiropractic care provided to 232 unique patients at Cross Lake Nursing Station during the post-implementation period (October 2023-May 2025), totaling 1384 patient visits.[66] The report documents high rates of education/exercise within chiropractic encounters, suggesting complementary roles, with approximately 80% of patients receiving education and rehabilitation/ exercise interventions, a proportion much higher than observed nationally and internationally.[67,68] However, the implementation window of the project extends beyond our study period (our Results include six WSCC referrals Oct 2023–Aug 2024). Together, our findings[39,40] support growing recommendations to integrate non-pharmacological care into interdisciplinary teams for a full range of evidence based spinal pain interventions rather than an add-on service to improve patient outcomes.[12-14] Consistent, harmonized documentation would support interprofessional communication, improve visibility of non-pharmacological care across providers, ensuring continuity and consistency of care.

Referrals to external services including physiotherapy and specialist care also slightly declined post-implementation. This trend may be attributed to the increased access to the newly introduced chiropractic service, which received a modest number of new referrals during the study period. Notably, several referrals were still pending at the time of data abstraction, suggesting that the full impact of the service may not yet be captured. The unpublished report indicates that nearly one fifth (18.2%) of the 232 unique patients had been referred to the WSC Canada clinic by either Cross Lake Nursing Station MDs (7.3%), a registered nurse (7.7%) or the staff (3.2%).[66]

Equity and Culture

Despite the documented changes in care processes, few patient charts included patient-reported outcome or experience measures (PROMs/PREMs).[69] While these tools can help monitor MSK care quality,[70-72] they are often grounded in Western biomedical frameworks that may fail to capture Indigenous perspectives of health, including physical, emotional, and spiritual healing and community well-being[32]. In particular, emotional and spiritual

dimensions of pain, often rooted in the intergenerational experience of colonization and the ongoing experiences of systemic racism, can profoundly affect the healthcare experiences of Indigenous persons in Canada and requires culturally responsive approaches to assessment and care.[73,74]

Systemic inequities in the Canadian healthcare system—including racism, implicit bias, and harmful stereotypes contribute to the disproportionate burden of chronic MSK conditions among Indigenous populations.[75-79] These inequities are exacerbated by limited access to primary and specialized pain services in remote communities, as well as financial barriers and as a result, there is often over-reliance on pharmaceuticals, including opioids, as first-line treatment.[78,79]

Expanding access to culturally safe, non-pharmacological therapies requires integrating Indigenous healing practices such as land-based healing, traditional medicine, and the active involvement of Elders and Knowledge Keepers into care pathways.[76] Other holistic approaches, such as chiropractic care, also merit consideration as a first-line intervention. Holistic practices are not peripheral but central to Indigenous worldviews on health and should be embedded within primary care systems.[80,81]

Culturally safe care involves respectful engagement that recognizes and strives to address power imbalances inherent in the healthcare system.[81] For Indigenous peoples, this means comprehensive care models that incorporates family, community traditions, ceremonies (e.g., smudging, sweats, talking circles), and protocols which are all elements central to healing.[82-84] Integrating traditional healing practices with multidisciplinary models for managing chronic pain may improve outcomes by aligning care with cultural values and lived experiences of patients.[75] Importantly, traditional medicine and conventional treatments need not be mutually exclusive, as their integration can support more holistic, person-centered care.[76,81,85]

To ensure that culturally responsive care is consistently delivered, there is a need to co-develop culturally safe care standards with Elders, traditional healers, and community members.[85] Such standards should inform provider licensing, education, and ongoing evaluation in primary care fields, including chiropractic.[86]

In parallel, investments in training and certifying local Indigenous health workers, including nurse practitioners, physician assistants, and providers of manual therapy and mental health therapies, can strengthen cultural competence and foster trust.[87,88] These individuals often share languages, values, and community ties, and are more likely to remain in their roles over time.

Finally, reducing reliance on short-term fly-in health providers is essential for improving relational continuity and cultural safety. Increasing the number of full-time community-based medical and allied health professionals such as chiropractors, can help establish sustainable, community-embedded care.[89-91]

Strengths and limitations

Few studies have documented routine MSK care delivery in remote Indigenous communities in Canada. The present study offers valuable preliminary insights into how the introduction of a culturally responsive spine care model may influence clinical practices in underserved Indigenous communities. However, several limitations must be acknowledged including convenience sampling from paper charts; potential selection/measurement bias (including inconsistent pain chronicity and red-flag capture); short post window (10 months); 43% overlap of patients across periods; small sample precluding inferential testing. Findings are preliminary and hypothesis-generating. Finally, the sparse and variable quality of clinical documentation restricted our ability to assess the appropriateness of care, such as whether imaging was warranted based on red flags, or higher-risk medications (e.g., opioids and gabapentinoids) were prescribed concurrently.[56]

Implications for practice and future research

This study contributes to the limited body of literature describing routine MSK care in northern Indigenous communities and provides preliminary evidence that integrating the GSCI model may influence clinical practice patterns towards evidence-based guideline congruent care. Customizing this model to align with the cultural, spiritual, and social contexts of the local community is essential for sustainability and community acceptance.[29] Future research should aim to incorporate longitudinal and mixed-methods designs to better understand outcomes over time, include culturally relevant PROMs/PREMs to capture patients' lived experiences, and partner with communities in co-designing services that reflect their values and preferences.[92] Quasi-experimental or im-

plementation studies could further evaluate the impact of the GSCI model on care quality, safety, and patient outcomes in underserved settings.

Conclusion

This exploratory study suggests that implementing a culturally sensitive chiropractic service based on the GSCI model was associated with reduced imaging and lower prescribing of several common MSK medications in a remote Indigenous community. Larger, longitudinal, mixed-methods evaluations with standardized documentation and culturally relevant PROMs/PREMs are warranted.

Acknowledgments

We thank our community partners for their guidance and their efforts to ensure that the data collection tool and study results reflect the lived experiences of the people of Pimicikamak. We also thank the nursing station staff (administrative, security and medical records) for providing lodging and support, the medical staff for their cooperation and collaboration, and the Cross Lake Band for their ongoing support and hospitality.

Abbreviations: GSCI: Global Spine care Initiative; LBP: Low Back Pain; NSAIDs: non-steroidal anti-inflammatory drugs; PREM: Patients Reported Experience Measures; PROMs: Patient Reported Outcome Measures; WSC: World Spine Care; WSCC: World Spine Care Canada.

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Appendix 1.

Chart review: pre- and post-implementation data collection tool

Community: Pimicikamak **Clinic: Cross Lake First Nation Nursing Station, Manitoba, Canada**

Today's Date _____

Purpose: The purpose of this chart review is to help determine the type of care provided to people presenting to the local primary clinic with a complaint of back or neck pain in the past year. Please review the charts of each person in the household.

Instructions: Please select three (3) consecutive files each month between DATE and DATE, up to a total of 50 patient files.

For each of the 50 files you have selected, please answer the following questions: Use a separate sheet for each file.

Tool: This form was adapted from the Global Spine Care Initiative (GSCI) spine care pathway/FlashCards and prior use in Low Middle-Income Countries by team members. Information to be collected includes baseline demographics (age, gender), reason for consultation (back, neck pain), care delivered (pharmaceutical and non-pharmaceutical), number of spine pain episodes, use of patient health questionnaires, imaging, treating clinicians, and referrals.

Obtained patient consent Y N

Cross Lake Nursing Station File number:_____

ID # assigned by GSCI _____

1. Age (years): _____

2. Sex
   a. Male
   b. Female
   c. Other

3. Did this patient attend this clinic for:
   a. neck pain
   b. thoracic pain
   c. lumbar pain
   d. extremity pain
   e. Not reported

4. For the most recent episode of **spine pain or extremity pain**, what was its duration:
   a. Acute (< 3 months)
   b. Chronic pain (≥ 3 months)
   c. Not reported

5. What was the pain intensity?
   a. Minimal (1-1/10)
   b. Mild (2 to 4/10)
   c. Moderate (5 to 7/10)
   d. Severe (8 to 10/10)
   e. Not reported

6. Is the patient able to work or do his/her usual activities?
   a. Y b. N

7. For the most recent episode of **spine pain**, was the onset:
   a. Traumatic b. Non-traumatic

8. Was diagnostic imaging ordered?
   a. Y b. N

9. If the answered is 'yes' to Q8, please indicate the type of **imaging ordered in the past 12 months** (either at the clinic or elsewhere):

9.1. X rays a. Taken at: Local facility b. Distant facility: Thompson or Norway house
c. Winnipeg d. By: Plane

9.2. CT Scan a. Taken at: Local facility b. Distant facility: Thompson or Norway house
c. Winnipeg d. By: Plane

9.3. MRI a. Taken at: Local facility b. Distant facility: Thompson or Norway house
c. Winnipeg d. By: Plane

9.4. Abdominal U/S a. Taken at: Local facility b. Distant facility: Thompson or Norway house
c. Winnipeg d. By: Plane

9.5. Bone Scan a. Taken at: Local facility b. Distant facility: Thompson or Norway house
c. Winnipeg d. By: Plane

10. If this adult attended for neck and/or back pain, was/is this adult being treated for that neck or back pain at this clinic: a. Y b. N

If No, skip to Q. 14

11. If this adult was/is being treated, was/is this adult being treated with the following:

a. Medications: Prescribed or delivered by: _____

1. NSAID
2. Acetaminophen
3. Muscle relaxants
4. Opioids/Narcotics Type/Name _____
   Were opioid medication prescribed for back/neck pain
5. Other: (specify) _____
6. Was any medication delivered by injection/intravenously?
7. Non-prescribed or illegal substances? a. Y b. N c. Not reported

If yes list these medications: _____

b. Massage of the spine Delivered by: _____ This information is not in the chart

c. Manipulation of the spine Delivered by: _____ This information is not in the chart

d. Home or group exercises Delivered by: _____ This information is not in the chart

e. Education (neck/back) Delivered by: _____ This information is not in the chart

f. Advice on self-care Delivered by: _____ This information is not in the chart

g. Corset, back brace, assistive device Delivered by: _____ This information is not in the chart

12. Over the last 12 months, total number of treatment visits this patient received for each episode of care for spine/extremity pain?

a. Episode 1 (if applicable) _____

b. Episode 2 (if applicable) _____

c. Most Recent Episode _____

13. How many treatment visits in total did this patient have for their neck/back pain? _____
This information is not in the chart

14. Was the patient referred to someone else beyond the primary care clinic? a. Y b. N
This information is not in the chart

If yes, please specify:

a. Physiotherapy (PT)
b. Orthopedic surgeon
c. Neurosurgeon
d. Emergency room
e. Other

15. History of addiction to opioids? a. Y b. N

16. Any adverse events due to opioids? a. Y b. N

If you have any additional comments, please use the space below