Implementation Science Communications

RESEARCH

Open Access

Views and perspectives toward implementing the Global Spine Care Initiative (GSCI) model of care, and related spine care program by the people in Cross Lake, Northern Manitoba, Canada: a qualitative study using the Theoretical Domain Framework (TDF)

Nicole Robak[1], Elena Broeckelmann[1], Silvano Mior[2], Melissa Atkinson-Graham[2,3,4], Jennifer Ward[1], Muriel Scott[5], Steven Passmore[1], Deborah Kopansky-Giles[2,7], Patricia Tavares[2], Jean Moss[6], Jacqueline Ladwig[1], Cheryl Glazebrook[1], David Monias[8], Helga Hamilton[5], Donnie McKay[5], Randall Smolinski[9], Scott Haldeman[10,11] and André Bussières[1,3,12*]

Abstract

Background Back pain is very common and a leading cause of disability worldwide. Due to health care system inequalities, Indigenous communities have a disproportionately higher prevalence of injury and acute and chronic diseases compared to the general Canadian population. Indigenous communities, particularly in northern Canada, have limited access to evidence-based spine care. Strategies established in collaboration with Indigenous peoples are needed to address unmet healthcare needs, including spine care (chiropractic and movement program) services. This study aimed to understand the views and perspectives of Cross Lake community leaders and clinicians working at Cross Lake Nursing Station (CLNS) in northern Manitoba regarding the implementation of the Global Spine Care Initiative (GSCI) model of spine care (MoC) and related implementation strategies.

Method A qualitative exploratory design using an interpretivist paradigm was used. Twenty community partners were invited to participate in semi-structured interviews underpinned by the Theoretical Domains Framework (TDF) adapted to capture pertinent information. Data were analyzed deductively and inductively, and the interpretation of findings were explored in consultation with community members and partners.

Results Community leaders ($n=9$) and physicians, nurses, and allied health workers ($n=11$) emphasized: 1) the importance of contextualizing the MoC (triaging and care pathway) and proposed new services through in-person community engagement; 2) the need and desire for local non-pharmacological spine care approaches; and 3) streamlining patient triage and CLNS workflow. Recommendations for the streamlining included reducing managerial/administrative duties, educating new incoming clinicians, incorporating follow-up appointments for spine pain

*Correspondence:
André Bussières
andre.bussieres@uqtr.ca
Full list of author information is available at the end of the article

patients, and establishing an electronic medical record system along with a patient portal. Suggestions regarding how to sustain the new spine care services included providing transportation, protecting allocated clinic space, resolving insurance coverage discrepancies, addressing misconceptions about chiropractic care, instilling the value of physical activity for self-care and pain relief, and a short-term (30-day) incentivised movement program which considers a variety of movement options and offers a social component after each session.

Conclusion Community partners were favorable to the inclusion of a refined GSCI MoC. Adapting the TDF to unique Indigenous needs may help understand how best to implement the MoC in communities with similar needs.

Keywords Qualitative research, Spine care, Implementation science, Medically underserved area, Vulnerable population, Chiropractic, Non-pharmacological, Indigenous, Theoretical domains framework

Contributions to the literature

- Spine care access remains limited in remote Indigenous communities.
- Findings highlighted the need for a holistic approach to understanding spine symptoms or concerns and favouring non-pharmacological multimodal care; not sufficiently considered in standard Western clinical practice.
- Modifications to the Theoretical Domains Framework for the use in remote Indigenous communities are needed to better understand Indigenous ways of knowing and incorporate unique cultural needs, context and resources.

Introduction

In Canada, the term "Indigenous" encompasses First Nations, Inuit, and Métis peoples [1]. Centuries of colonialization and oppression has resulted in Indigenous peoples being amongst the most marginalized groups in Canada [2]. Discrimination against Indigenous peoples in the Canadian health care system often involves the mismanagement of pain [3–6].

Musculoskeletal disorders including low back pain (LBP), neck pain, osteoarthritis, injuries, and inflammatory arthritis affect approximately 1.71 billion people worldwide [7] and are the main cause of years lost to disability [8]. Due to the current inequities in the health care system [9], Indigenous communities in Canada bear a disproportionately higher prevalence of injury, acute and chronic diseases compared to the general Canadian population [10]. These communities continue to face systemic and structural barriers to safe medical care [10] that are rooted in the institutionalization of settler colonial racism [11].

World Spine Care, a not-for-profit organization, provides affordable, evidence-based spine care in communities that are underserved worldwide. The Global Spine Care Initiative (GSCI), an international collaboration of leading clinicians, scientists, specialists, government agencies, and other stakeholders from 24 countries, has developed a model of care (MoC) to reduce the burden of spine disorders [12]. The GSCI MoC (triage system and care pathways) includes: 1) ruling out serious pathological causes of spine pain requiring specialized medical investigation and/or treatment; 2) recommending evidence-based non-pharmacological approaches to those with non-specific spine pain; and 3) reducing unnecessary spinal imaging and opioid prescribing [13]. The MoC incorporates best practices consistent with recent evidence-based clinical practice guideline recommendations [12, 14–17], while considering unique local cultural influences, health system and economic design, and needed resources to support delivery of care.

While the GSCI MoC proposes to mitigate the increasing burden of spine pain in communities that are underserved, rigorous testing regarding implementation, sustainability, scalability, and cost-effectiveness across different cultural settings is needed. Implementation first requires understanding the contextual factors shaping adoption of health interventions, such as healthcare workers and decision makers priority setting, attitudes and beliefs, cultural and social norms, and the status of the wider health care system [18].

This study was undertaken with the community leaders, members, and clinicians in Cross Lake, Manitoba, Canada as part of a pre- and post- mixed-methods implementation project [19]. When conducting research with Indigenous people it is essential to recognize that Indigenous epistemologies and ways of knowing are different from western epistemologies (18), and thus it is important to include Indigenous perspectives. The GSCI team, which includes settler Canadians and Indigenous members, worked diligently to include the voice of the participants [20, 21]. This paper was drafted by a team of settler allies and Indigenous team members who consistently paused and reflected, listened to and read new perspectives. See Additional file 1 for our positionality statements.

Cross Lake is an Ininew (Cree)-speaking community [22], whose traditional territory is situated along the

Nelson River, including a collection of islands, within the boreal forest and Canadian shield, located approximately 800 km north of Winnipeg, Manitoba. The community has an on-reserve population of 6,734 and an off-reserve population of 2,715 [22]. Residents include First Nations, Métis, non-status and some non-Indigenous clinicians, teachers, and Royal Canadian Mounted Police Officers (RCMP). The people of Cross Lake are governed by four councils under customary law and include the Elders Council, the Women's Council, the Youth council and the elected Chief and Council.

In collaboration with the community and regional organizations, Cross Lake Band of Indians (CLBOI) Health Services provides comprehensive access to health and social services [23], including maternal child health, homecare, public health, dental services, traditional healers, allied health, and prevention programs. Collectively, the services promote a holistic delivery of healthcare, upholding the teachings of the medicine wheel that address the physical, mental, and spiritual wellness of its peoples. Fly-in nurses and primary care physicians provide emergency and ambulatory care to community members at the associated Cross Lake Nursing Station (CLNS), managed by Health Canada). Medical transport or telehealth consultation is arranged when more specialized care is required. However, the need for non-pharmacological, and culturally safe treatment options for spine conditions has not been sufficiently met [3, 24–27].

Implementation of the MoC first requires gaining an understanding of potential barriers to uptake, and how best to contextualize care. Through this collaborative journey, our study aimed to understand local partners' (community leaders, Nursing Station clinicians) views and perspectives, and perceived contextual factors likely to influence the implementation of the GSCI MoC, and new clinical services including chiropractic care and a group-based movement program.

Methodology

This study was made possible by a partnership agreement between WSCC and Pimicikamak Okimawin, the traditional government of the Cross Lake community, to introduce a MoC aimed to address the assessment and management of spinal disorders. A qualitative exploratory research design situated within the interpretivist paradigm was used to inform the implementation of a MoC for people with spine conditions in a Northern Indigenous community [28].

The final interpretation of the study was guided by a community engagement workshop in which the study aims, processes, and results were shared during a half-day open door session with community members [29, 30]. The session was advertised on the local radio and Facebook, and led by five team members (AB, MAG, JW, SP, JM) and a local research assistant (MS). Valuable feedback and critical reflections from community members were recorded on sticky notes and placed on posters displayed in the room, and incorporated into the study [29, 31].

Recruitment

We used purposive sampling with maximum variation to recruit participants for the qualitative study [32]. Eligible participants included community leaders (Band Council members, Chief, administrators, Elders, Director of CLBOI Health Services) and clinicians (physicians, nurses, allied health workers) with experience and understanding of the healthcare delivery and needs of the community. To ensure recruitment across a spectrum (spread of gender, years of experience, occupation), additional participants were identified using snowball sampling [32].

Interview guide and data collection

Semi-structured in-person or virtual interviews were conducted using an interview guide comprised of open-ended questions and probes, informed by the theoretical domains framework (TDF) [33, 34], and prior work by team members [34–39]. The TDF is a Euro-Western epistemological tool that provides a biomedical lens from which to consider multi-level influences on behavior change [40]. It distills 84 theoretical constructs into 14 domains to specify the characteristics of individuals and provides a validated taxonomy of implementation determinants applicable to health professional, health service administrators and decision makers, and patient behaviors [33, 34]. The TDF served to guide the identification of factors most likely to support or impede the implementation of the GSCI MoC, along with the proposed spine care services (Additional file 2).

All interviews were conducted between February and March 2023 by two clinician-researchers (AB, JW), with experience in conducting qualitive interviews and limited knowledge of participant partners. Interviews ranged between 45–60 min, were digitally audio recorded and transcribed verbatim. Transcripts were de-identified and reviewed for accuracy against recorded interviews. All interviews were completed prior to analyses. Demographic data gathered included gender, profession, and years of experience working in their role (emergency department, or as a community leader). The interview guide was first pilot tested with two participant partners (HH, RS). Gaps identified led to modifications of the TDF domains of 'Knowledge' and 'Environmental context and resources' by incorporating and defining new codes

related to "culture" and "context" deemed necessary to understand and support Indigenous perspectives.

Data analysis

Qualitative data analysis was conducted through an interpretivist lens [41]. Two reviewers (NR, EB) independently coded each transcript, met weekly to review coding and to achieve consensus, and revise transcript coding accordingly. Two senior authors (SM, AB) reviewed the coded transcripts to confirm appropriateness of coding, and where discrepant, all reviewers met to resolve disagreements from the original coders to increase the reliability of coding (i.e., crystallization) [42]. Data was analyzed using deductive and inductive coding [43]. Deductive codes used the theoretical domains of the TDF, following a defined coding guideline developed to ensure consistency amongst coders. Unique passages were attributed to the domain best reflecting its key theme but could also be attributed to multiple domains. Inductive coding was then used to generate unique themes and/or belief statements that were extant beyond the TDF framework [33, 34]. The researchers consulted with community leaders and clinicians on two separate site visits. In August 2023, we engaged community leaders and local clinicians to explore how our initial analysis reflected and resonated with what they shared with us in the interviews. Unique participant statements were extracted to reflect our interpretation of their meaning (Table 1). To ensure trustworthiness of the data, audit trails were kept throughout the study. Coding and analysis were managed using NVivo (QSR International, Version 12).

In March 2024, a community engagement workshop with other community leaders and prospective service users provided further input into the results.

Results

Participants

Twenty participant partners (community leaders [$n=9$] and clinicians [$n=11$]) consented to be interviewed. Community leaders were administrators of CLBOI, and the incorporated community of Cross Lake. Clinicians working in the CLNS were physicians ($n=4$), nurses ($n=3$), and allied health workers ($n=4$). Years of experience ranged from 6 months to 15 years.

Emerging themes

The emergent coding tree reflected both TDF deductive codes categorized and collapsed into representative inductive themes that spanned across all TDF codes (Additional file 2). We established new codes to enrich our understanding of 'Indigenous Knowledge culture' (i.e., diversity, specific components of culture, awareness of culture, sensitivities, and colonialism) and 'Environmental context and resources' (i.e., intergovernmental boundaries, legislation, political and economic jurisdiction). These modifications were reinforced by those who could attend the participatory workshop. The emergent five themes were: 1. Cultural context, 2. Providing care, 3. The experience of pain, 4. Opportunities for improvement, and 5. Proposed spine care program implementation.

Cultural context

This theme was informed by the TDF domains of 'Knowledge' and 'Environmental context and resources'. Leaders provided important Indigenous cultural context relevant to the implementation of spine care services in Cross Lake, where people have experienced lifestyle changes over the years, leading to emotional, spiritual, and cultural disconnect. Traditionally, the community would gather at the old treaty grounds where Elders shared their traditional teachings and cultural practices. They described such gatherings as happy, comforting and healing, where silence was integrated into the lifestyle, facilitating spiritual connection. However, a community leader described how the community is not as connected as it once was and the weakening of interpersonal bonds, resulted in a small community feeling like a large city, where neighbors don't know each other (see Table 1:L2a).

The traditional territory of Pimicikamak (Cross Lake) included a series of islands and was accessible only by canoe before the hydroelectric dam and roads were built by the province of Manitoba. The leaders described how prior to these changes their peoples' movement was ubiquitous and incorporated into their lifestyle because of the need to retrieve water and gather wood to heat their homes (Additional file 3 [AF3]:L3a). This lifestyle changed with the devasting environmental impacts of the hydroelectric dam, virtually eliminating the ability to live off the land and negatively impacted their mobility. As noted by a leader: *"We were healthy then and we had healthy spines, and they were strong"* (L4).

One leader noted that road access, flooded lands and housing developments spread across 35 kms have impacted the sense of community (Table 1: L4a). The advent of COVID-19 further disconnected community members. While some anxious individuals found peace in solitude, the pandemic decreased interpersonal engagement overall. Technological changes brought into the community also created a generational disconnect. For instance, unlike the older generation, the younger generation learned English through TV (AF3:L5a). Participants reflected on how access to new technologies has increased sedentary behaviour (AF3:L2b).

Table 1 Community participant interview passages

Theme	Theme Description	Community Partners	Quote
Cultural context	Indigenous cultural context pertinent to spine care services in Cross Lake *Informed by the TDF domains of 'Knowledge' and 'Environmental context and resources'*	L2a	Really, I'm supposed to tell you that we're still a close-knit community. That we all know each other, but I can tell, if you go to Alberts Lake, the one neighbor may know their neighbors name, but asked them what they did yesterday afternoon; they all can't tell you. It's really small, but like a big city with big city problems
		L4a	"There's a bit of an economic change over the years, too much, too fast. It's like cultural shock. It's different kind of shock, so we are adapting to that change gracefully. That's running and hopping into our trucks and drive 200 yards away. I don't walk. It's crazy…We have to change that and go back to promoting a healthy lifestyle."
		L2a	"The VLT example. That desire to be somewhere but no where. I think that is our way of filling the void with what used to be out spiritual experience"
			"We would make time for that back in the day. You simply lived it. You had silence. You'd make time for silence during the day. Consciously or unconsciously. Its when you have silence that's when you connect yourself to your spirit. What do VLTs do? They take us away from reality for however long"
		L3a	"People are scared to do culture things here. We've been told all our lives how to live, how to do things, what to do, how to dress; How to look; How to do things? People are very skeptical about those things."
Providing Care	Access and types of care delivered to community members *Informed by the TDF domains: 'Skills', 'Knowledge', 'Beliefs about capabilities', 'Cognition', 'Environmental context and resources', 'Social Influences,' and 'Emotion'*	L4b	Canada is supposed to have health services. They're supposed to be universal. They're supposed to be affordable and accessible. Healthcare is not universal. It's not the same in Winnipeg as in Cross Lake. North or South Province. They are lacking"
		L3b	"It's not community based and it's not accessible. Most of it's not portable. So, it really affects their lifestyle. I'm glad you said that, because that's the biggest thing. Our people want to get better, but everything's out there. Not here. It's always about the medicine You have to get pills or something like that."
		C1a	"In terms of management, it can be difficult sometimes to prescribe the appropriate non-pharmacological measures."
		L5a	"We were more or less neglected out in the bush. Gradually, we go out to the system to be able to face people's oversight. Telling our stories, even telling our stories. Some of those people out in the South, they didn't really trust or believe us. They didn't believe till they actually came to see what was happening."

Table 1 (continued)

Theme	Theme Description	Community Partners	Quote
Experience of pain	The lived experience of pain, pain self-management, and clinician pain assessment and management *Informed by the TDF domains: 'Skills', 'Knowledge', 'Social/Professional role and identity', 'Beliefs about capabilities', and 'Social influences'*	L8a	"I was in so much pain, and I went to an Emerge facility. It was terrible what happened there. … the physician that was on call did not believe that I was there for pain. I know I was labeled. I laughed like absolute embarrassment, and my sister said, "do you want to go try acupuncture"? I was at that point, because I did not want to do anything. I did an hour of acupuncture, and I came home and I could do hours of cartwheels. That's where it started. Doing chiro, massage, acupuncture and not having to take medication. It makes the world of difference."
		C2a	"Anxiety is huge up here. Lots of Marijuana use to try to cope with that, and it's not helpful at all. […] It's always odd when I find out that someone hasn't been drinking for like a year or more, or that someone isn't using marijuana because marijuana is a be all end all. We find all these young men, they have cannabis induced psychosis, and we see that a lot as well. I think just trying to educate too and just say "Pot is not healthy. No matter what they've been told. This is not going to be the solution to your anxiety and to your emotional difficulties"
		C6a	"…, a lot of the problem is that the source of the mental health problems is not necessarily a problem that could be solved on the medical side of things, right? It is social determinants that affects a lot of it, and we can just provide support. Sometimes you feel you can't fix the problem because it's too over whelming."
		C1b	"A physician wants to feel good about the (doctor patient) interaction, but also to feel like they've helped. There's nothing worse than listening to an issue and not being able to help your patient, not having a real good option, or at least a reasonable option"

Table 1 (continued)

Theme	Theme Description	Community Partners	Quote
Opportunities for Improvement	Perspectives on challenges associated with pain management, continuity of care, back and neck pain education, treatment options, and system inadequacies *Informed by the TDF domains: 'Skills', 'Knowledge', 'Social/Professional role and identity', 'Beliefs about capabilities', 'Beliefs about consequences', 'Goals', 'Environmental context and resources', 'Social influences', and 'Emotion'*	C5a	"It is pretty hard to start that conversation if you've met that patient for the first time that day, because then you start to get some miscommunication. When you mention "mental health" and "pain" it kind of goes to (the patient) "oh, then it's all in my head", which is not the case. So, I typically will not bring up that initial point until our second time meeting. Again, it is a bit difficult to have that continuity of care because our clinic is set up in a way that people see patients first come first serve. So, you're not guaranteed to actually see the patient that you've seen in a couple of weeks."
		C6b	"With the nursing staff it is hard because they keep coming and going. I won't put a lot of resources there and tell all the nurses because they are here today. The problem is they are there for like six months or four months, so there's a lot of inconsistency. They move around a lot."
		L5b	"This has been our general dream. To get on our own. Get our own, nurses and everything. We have a few nurses already, but what we do is we put them in managerial positions, in some offices. They should be in a nursing station"
		C2b	"I think if there's more time, more ability, if there's more education, I think that that would make a difference"
Proposed Program Implementation	The new spine care service and community movement program as the proposed programs to implement in Cross Lakes *Informed by the TDF domains: 'Knowledge', 'Social/professional role and identity', 'Beliefs about capabilities', 'Optimism', 'Reinforcement', 'Intentions', 'Goals', 'Memory, attention, decision-making', 'Environmental context & resources', 'Social influences', 'Emotion', and 'Behavioral regulation'*	L9a	"There was a lot of people that [the chiropractor] was working with that have been on lots of pain meds that got off the pain meds. Unfortunately, the women wanted their trailer back to do stuff with it, so he didn't have a space to do it."
		L1a	"It used to be a college, but not anymore. There used to be an exercise area there, and then close it down. Many people attended that that exercise program. I think we need to go back to exercising. "
		C6c	"You would think that, if you take the specialist away from the tertiary centre and bring them to a remote area that you would have a good uptake. It doesn't necessarily always happen. I think if you have good logistical support that can ensure that patients are notified and that their mode of transportation can be confirmed, then you'll have a much better ability to see client."

Table 1 (continued)

Theme	Theme Description	Community Partners	Quote
New Clinical Service (sub theme)	Chiropractic care as a service *Informed by the TDF domains: 'Knowledge', 'Social/professional role and identity', 'Beliefs about capabilities', 'Optimism', 'Reinforcement', 'Intentions', 'Goals', 'Memory, attention, decision-making', 'Environmental context & resources', 'Social influences', 'Emotion', and 'Behavioral regulation'*	L8b	"I was under the opinion that you can't see a chiropractor because they're going to snap your neck. Where did that come from? I don't remember, but I do remember being very firm like that was a belief to my core. In Indigenous communities, there's some of these beliefs. They're myths but turn into beliefs and we hold them dearly."
		C11a	"[…], I've never really thought about referring people to chiropractors. You know there is stigma, perhaps. In your first years of medicine, you hear, "oh, there are evidence that chiropractors can cause harm", so I think it's instilled by training to be a little bit fearful and doubtful"
		L7a	"That might have the greatest pull to have some effect on change, because that would be the right people at the table. You know the one saying "yes, our people need this", This one saying "these are the benefits here". They can't argue it because they know they did it before."
Community Movement Program (sub theme)	Group-based movement program *Informed by the TDF domains: 'Knowledge', 'Social/professional role and identity', 'Beliefs about capabilities', 'Optimism', 'Reinforcement', 'Intentions', 'Goals', 'Memory, attention, decision-making', 'Environmental context & resources', 'Social influences', 'Emotion', and 'Behavioral regulation'*	C3a	"I think every chronic sicknesses, people have aches and pains, muscle pains, or you know they can't move around, to encourage them to… have that physical activity, so they'll feel much better if they do these exercises. That way, they will know… exercise is important for everybody, and [for] people with disability. We need to reach out to these people, because I hear them say, "oh, there's nothing for us". They give up, you hear them say "They don't do anything for us". We have no resources… I promote warm-up exercises. Go out in nature, walk. Go for a walk in the community"
		C1c	"In terms of management, it can be difficult sometimes to prescribe the appropriate non-pharmacological measures. Recently, with many of these remote northern communities having access to the Internet, It's actually been interesting because I've prescribed physiotherapy by YouTube. There are a couple therapist that I like on YouTube; Brad and Bob I think. They do a good job. They're licensed. I like their approaches. They seem quite reasonable, and it's free of charge, their advice. So, I've used that, and patients who are actually willing to explore have sometimes found this helpful"
		L8c	"Lack of motivation, because we've done some and that's my concern. I said, "how are we going to prevent that." Because we've done yoga classes, spin classes. We've had nurses who will teach these things, and RCMP. People [come a few times] and then they say, "oh, I can't make it tonight, and then they all become ghosts, right?"

C Clinician, *L* Leader, *EMR* Electronic medical records, *RCMP* Royal Canadian Mounted Police

Leaders also described a spiritual disconnect. In the past, spiritual connection was afforded because silence was present in day-to-day life. One leader shared that silence has now been filled with the introduction of the Video Lotto Terminals (Table 1:L2a). However, the community is slowly re-embracing and returning past cultural ceremonies (sweat lodges, Sun Dances, smudging) that were impacted by childhood trauma from the residential schools (Table 1:L3a & AF3:L9a).

Providing care

Leaders and clinicians discussed access and types of care delivered to community members. The theme 'Providing care' emerged in conversation; and helped to contextualize the significance of seven related TDF domains of 'Skills', 'Knowledge', 'Beliefs about capabilities', 'Cognition', 'Environmental context and resources', 'Social Influences', and 'Emotion'. The lifestyle changes, described under 'cultural context', also affected the community's holistic approach to health. The leaders and clinicians described the different challenges that community members face when accessing care, including having to travel distances to other health centres. The leaders also described how their reliance on provincial and federal government healthcare coverage often failed to address their needs (Table 1:L4b).

Leaders and clinicians identified that spine care options are not always locally accessible, except for medications (Table 1:L3b & C1a). This also means that individuals are required to travel to Winnipeg or Thompson for advanced imaging and seeing medical specialists or rehabilitation providers. Community leaders noted that treatment for back pain is not always delivered in a timely fashion (AF3:L4a). Consequently, people often live with old injuries: *"You just have to look at our people. You'll see them waddling around. So many of them. They're not even that old."* (L3).

Leaders described the discrepancy and inequality in healthcare stemming from unclear provincial and federal jurisdiction boundaries for northern Indigenous communities. Health Canada is the federal jurisdiction and sustains most programs in Cross Lake (AF3:L8a). The 1964 agreement placed the community under provincial jurisdiction for healthcare. However, only physicians are under provincial jurisdiction (AF3:L8a). Upon reflection of the jurisdictional responsibilities for care delivery, the leaders expressed that it was their responsibility to advocate for their community to ensure healthcare needs are met (AF3:L2c). They identified several challenges associated with treatment of spinal pain and rehabilitation, including: 1) Federal Non-Insured Health Benefits program not covering costs for non-pharmacological options, 2) cutbacks to federal and provincial healthcare coverage, 3) minimal or no employer health care coverage, and 4) an estimated 70% of the community is on social assistance. The leaders described the discrepant distribution of healthcare funding and provision of care, highlighting the impact of regional differences across the province of Manitoba: *"It's not the same in Winnipeg as in Cross Lake, North or South province – They're lacking here"* (L4). In advocating for their community, leaders try to use stories to describe these challenges, but its only when government officials or others visit and observe the state of health care in their community, or more poignantly when tragedy strikes, that government officials become attentive to those stories (Table 1:L5a).

Experience of pain

This theme was informed by the TDF domains of 'Skills', 'Knowledge', 'Social/Professional role and identity', 'Beliefs about capabilities', and 'Social influences'. Leaders described the lived experiences of pain endured by their families and friends, how they self-manage, and how clinicians assess and manage pain. They described pain as encompassing mental, emotional, spiritual, and physical experiences (AF3:L4b; C2a). Leaders described how historical pain and childhood trauma from residential schools not only caused, but exacerbated, such experiences, especially after the discovery of unmarked graves (AF3:L3b).

Access to immediate and appropriate musculoskeletal care has been challenging and often unavailable in the community (AF3:C5a). Leaders shared that the traumatic injuries from motor vehicle collisions or falls often became chronic due to delayed care. When pain becomes too intense, difficult to manage, or not well attended, the leaders we spoke with described how community members attempt to self-manage or seek rehabilitative care outside the community (Table 1:L8a). Some people 'self-medicate' when the pain becomes debilitating and care is unavailable, symbolically reflected in one leader's comment: *"You're not smelling the alcohol or the drugs. You're smelling the pain"* (L4).

Partners noted that online spaces such as Facebook have become sources of information on pain relief strategies (Table 1:C2a), or places to source analgesics such as Tylenol with codeine (T3) to help ameliorate pain. (AF3:L3c). Leaders emphasized the importance of clearly communicating potential side-effects of these types of medication as community members may not be aware of the risks of opioid use. Listening and learning from people in pain, and understanding that people in Cross Lake may not have access to timely and appropriate care for their pain, is an important point for the implementation of the MoC. Leaders and clinicians also suggested the

potential benefit of a home counselling service to address addiction as part of the MoC.

Clinicians' perspective on pain and their approach to managing spine pain is primarily grounded in their biomedical training (AF3:C5b). Clinicians believed they were sufficiently trained to identify warning signs of serious back pain, determine when imaging and pharmacological therapies are needed, able to address addiction-related concerns, and offer self-management strategies (AF3:C1a). They acknowledged that patient stress, anxiety, depression, and psychological trauma play a large role in LBP management (AF3:C5c), whilst expressing a lack of training on mental health issues. When appropriate, patients with these comorbidities can be referred to mental health workers at the CLNS (AF3:C2b).

While clinicians reported complying with guideline recommendations *not* to prescribe narcotics (AF3:C1b), they reported having limited access to appropriate and effective non-pharmacological treatment options (AF3:C11a), lacking confidence and time to properly teach and prescribe exercise (AF3:C6a; C6b), or to encourage behaviour change or provide public health messages to patients (AF3:C6c), particularly when other health factors were out of their control such as social determinants (Table 1:C6a). Nonetheless, clinicians felt capable of supporting a patient's recovery, especially if they had a broader 'toolbox' that covered both interpersonal skills and rehabilitation services. Rehabilitation services as provided by chiropractors, physiotherapists, and kinesiologists are not routinely available in Cross Lake (AF3:C6d). Clinicians described a sense of helplessness (Table 1:C1b) recognizing the many factors contributing to the experience of spine pain, but aware of the insufficient resources available to address such factors.

Opportunities for improvement

Participants shared their perspectives on individual and organizational challenges that impeded efficient pain management and continuity of care, including minimal education on back and neck pain, limited availability of on-site community treatment options, and system inadequacies. These discussions were captured under the theme Opportunities for improvement as informed by the TDF domains of 'Skills', 'Knowledge', 'Social/Professional role and identity', 'Beliefs about capabilities', 'Beliefs about consequences', 'Goals', 'Environmental context and resources', 'Social influences', and 'Emotion'.

Clinicians described how the first-come, first-serve care system, paired with the absence of an electronic medical record (EMR), are problematic. They also described how patients' spine pain history and treatment response requires repeated assessments, where time constraints and the lack of consistency of care due to frequent changes of clinicians decreases patients' willingness to openly communicate (Table 1:C5a). Clinicians mentioned how establishing a healthy patient-doctor relationship and shared decision-making is crucial for successful spine pain management (AF3:C1c), and hoped for increased interprofessional collaboration. Consultation requests for medical specialist are not accepted without advanced imaging (AF3:C5e). Thus, patients must travel outside the community for imaging studies (AF3:C1d), and notifying patients of these appointment can be difficult (AF3: C8a + 7a). Chronic nursing shortages (AF3: C9a) and staff fluctuations have been particularly challenging, requiring regular orientation of new personnel (Table 1:C6b).

Participants offered various solutions to improve the spine care services, such as:

1) Reducing managerial/administrative duties to allow nurses time to deliver care, and enticing local nurses to return to active duties would improve consistency of care (Table 1:L5b);
2) Organizing follow-up appointments with the same physician to strengthen doctor-patient relationship, thus allowing for in-depth conversation around treatment options, and patient education (Table 1:C2b); 3) When appropriate, referring to a mental health worker to comprehensively address non-medically urgent comorbid mental health conditions that can accompany chronic spine pain. This can increase patient comfort and trust to openly discuss mental health concerns, and 4) Implementing an EMR system to improve continuity of care would speed up re-evaluations, allow more time to address non-urgent issues, and improve interprofessional communication (AF3:C11b). A double-sided paper-based patient questionnaire with visuals and accessible language on one side, and check boxes for actions to be taken or already taken by the physician during patient assessment on the other *('my care map'*; AF3:C1e) could visually capture care pathways increase patient comprehension, acceptance, and adherence to recommended exercises (AF3:C6e), and ease shared decision-making; 5) Providing comprehensive educational materials to orient new/visiting staff about available resources could help offload regular staff (AF3:C10a), while supporting clinicians expressed desire for a *team-based approach* to patient care; and 6) Participating leaders and clinicians emphasized that health issues should be addressed and treated in a holistic manner (AF3:L4c&C2c). To this end, grouping health and social providers in the new Cross Lake Health Complex (CLHC; under construc-

tion when this study took place) is anticipated to create more opportunities for inter-professional collaboration and problem-solving.

Proposed program implementation

The final theme was informed by the TDF domains of 'Knowledge', 'Social/professional role and identity', 'Beliefs about capabilities', 'Optimism', 'Reinforcement', 'Intentions', 'Goals', 'Memory, attention, decision-making', 'Environmental context & resources', 'Social influences', 'Emotion', and 'Behavioral regulation'.

The proposed new spine care service and a community movement program were generally met with optimism. Both leaders and clinicians suggested that non-pharmacological care options aligned well with traditional healing approaches and could improve pain management and reduce reliance on medication. Participants believed the new on-site services could lessen the need for community members to travel long distances for care and unnecessary imaging referrals (AF3:C11c). One leader shared that non-pharmacological alternatives contribute to the "general dream" of reclaiming self-sufficiency and self-determination (AF3:L5b).

To successfully implement programs with the community, leaders and clinicians offered numerous suggestions (Additional file 4), namely: 1) community and Elders' involvement from the outset to ensure programs are based on needs and wishes of the community, and increase their uptake; 2) consistent accessible, targeted, and transparent communication; 3) promoting proposed programs through in-person engagement stressed as a culturally relevant consideration for all, but also using social media for the youth, and the radio or TV for Elders (AF3:C4a); 4) safeguarding allocated space, giving the example of a chiropractor years ago, who helped community members and reduced need for pain medication, but who left after the fitness facility was torn down with no alternative space available (Table 1:L9a, L1a). When open, the new CLHC should provide needed space for chiropractic care and the community movement program; 5) provide transportation within the community as there are community members who are housebound due to health or transportation issues. Other transportation concerns described related to: i) the vastness of the community; ii) difficult terrain; and iii) safety due to no sidewalks and unleashed pets. (Table 1:C6c). One leader had contrasting views on whether transportation was truly an issue because most people have a vehicle (AF3:L1a).

New clinical service

Leaders felt that chiropractic care aligns with holistic care but warned of potential misconceptions that community members may harbor, as one leader shared: "*You can't see a chiropractor because they're going to snap your neck… In Indigenous communities, there's some of these beliefs. They're myths but turn into beliefs and we hold them dearly*" (Table 1:L8b). Many clinicians shared that chiropractic care can expand services and help manage people's spine problems; however, such care was portrayed negatively during their medical training, leading to apprehension towards recommending this treatment for neck pain (Table 1:C11a). Clinicians also suggested that reading material, endorsements from the lead nurse and outspoken colleagues, and testimonials from satisfied patients could provide positive perspectives and encourage community members to consult. They also shared the importance of sustaining this clinical service, offering that community leaders and the Canadian Chiropractic Association should collaborate to advocate to the federal government for sustainability, using results from this implementation project (Table 1:L7a). It was also noted that the CLBOI could potentially provide partial payment for community members without insurance.

Community movement program

Clinicians and Leaders approved of the idea of a semi-structured group-based movement opportunity through which community members can actively participate in their symptom recovery and/or prevent recurrence. Aside from seasonal events, few group-based physical activity opportunities are currently available (Table 1: C3a). Some clinicians suggested exercises by a physiotherapist on YouTube (Table 1:C1c) but expressed confidence that an in-person program with knowledgeable providers would help. High motivation will be key to the success of the movement program as past programs had high dropout rates (Table 1:L8c). To facilitate long-term success, participant suggestions included: 1) valuing physical activity for pain relief and as protection against injury, and testimonials from athletes and regular community members; 2) a 30-day program with prize raffles for attendees upon completion; 3) incorporating a social component with healthy snacks post-workout to build social connections and support, and make each other 'accountable'; and 4) providing various activity options to appeal to individual preferences.

Community engagement workshop

The significance of our study findings was enriched by the generative comments and reflections shared during the community engagement session (Table 2). Feedback received echoed and affirmed the forms of disconnection that community leaders and clinicians discussed in their interviews. Community members affirmed the socio-historical significance of the hydroelectric dam on the health

Table 2 Comments and reflections shared by participant at the community engagement workshop

Theme*(TDF domains)*	Community Feedback on Theme	Community Reflections on Theme
Geographical Location *(Environmental context and resources; Beliefs about consequences)*	• Commuting to and from the community	• [Driving out of the community] when you hit a bump when you have back pain this is torture • When you feel better after treatment then you have to drive ALL the way back home • [Appointments in] Thompson not too serious, [appointments in] Winnipeg serious
Lifestyle Change *(Environmental context and resources; Knowledge (culture); Social/professional role and identity; Emotion; Beliefs about consequences)*	• Community is divided after the flood • Road and dam decrease mobility [and now] everyone drives; children and adults are less active, have more back pain • Winnipeg has to understand challenges in Cross Lake related to the Hydro Impact • No economic prosperity for the majority of [community] members • Contrasting beliefs about supporting [the Northern Flood Agreement]	• Things changed since 1976; Hydro dam was detrimental to the community • A lot of people used to live off the land and they can't now because of what hydro did and [the] lands [that were] flooded and drained • People fished the river, but now [have to] drive a boat 2 h away to do angling • Trapping was a money maker, but we don't do that now. [There were] beaver and muskrats [and the peoples'] needs were met. [Now] water is too high can't trap, can't hunt (lose active life); Kids don't get to learn [hunting and fishing] • Dam ruined trapping and fishing, led to [increase in] alcoholism • People depended on processed food after the dam • Clean clear water before dam (used nets), [people did] physical work [and] stayed active • People are moving inland now and out from the river. Everyone wants a vehicle because there are roads now [since] the dam • Feel caged in the limits of the reserve. [It has] created divisions • Families used to be beside each other but they're not now; they are so [disconnected and] spread out. People don't know what's going on anymore. Community provided for each other, and people shared their bounty harvest. [This] happens less now
Pain Management *(Beliefs about consequences; Social/professional role and identity; Social influences; Knowledge (culture); Behaviour regulation)*	• Home visits preferred • Good that we [self] manage pain • Chiropractor good, no meds • Go to Winnipeg to chiropractor or Thompson for [injections] • Education [for] kids • Trust issues [related to] health complaints and privacy for sensitive issues • If people [are seen] going for mental health and addictions consults [they may] get judged • When observe community. [notice that people in] pain and dysfunction don't participate • Just pain meds [like] Toradol shots [at the] nursing station	• [When] back hurts, I stay home • Tried meds, don't really work, [nor did] injections in Thompson • "Drug seeker labels" – see it happening in Thompson. MDs assume they are there for drugs

Table 2 (continued)

Theme*(TDF domains)*	Community Feedback on Theme	Community Reflections on Theme
Care Coverage *(Beliefs about consequences; Cognition; Social/professional role and identity; Knowledge (culture); Optimism)*	• People will pay for the services if they can afford it, but a lot of people can't • [Hydro workers, educators] get insurance coverage through work • Community insurance should cover everyone • How can we access Hydro funds to pay for chiro treatments • Talk to Chief and Council for sustained funding • [Collaborate with local services such] Jordan's Principle • Get put on the agenda at next [medical staffing] meeting; Advocate to [medical staffing agencies] to decide where the money goes	• People complain about just getting pain medication at the Nursing Station • [Chiropractic] is a good change, the people will use it • WSIB coverage, bill other agencies
Communication *(Knowledge (culture); Skills)*		• Kids today hide under hoodies • Very disconnected (80%)
Engagement/Education *(Social influences; Knowledge (culture, condition); Beliefs about consequences; Goals)*	• I don't really listen to radio station • More public Awareness • Education on stretching muscles makes pain go away • Land is so important. It will heal. It will teach	• The more modern we get the more sick we get • Get elders engaged to show others • Educate, [involve community] athletes (Hockey, baseball) on stretching and health (a summer camp) • Education and awareness of pain issues • [Educate on] how to go through process of Health System • Return of mobility and exercise • [Encourage] healthy eating
Nursing Station Flow *(Environmental context and resources; Knowledge; Social/professional role and identity)*	• Nursing station [staff] blames the individual and fails to look at the environment where your (sic) working	• Some older MD's seemed more hesitant to refer patients to chiropractors. Got defensive • Younger doctors were more open to refer to chiropractor or physiotherapist
Integrated Spine Programs and Healthcare *(Knowledge (condition, culture); Beliefs about consequences; Environmental context and resources; Beliefs about capability; Behavioural regulation)*	• Exercise brings out positive vibe; Go for a walk, feel better • Need land-based teachings for traditional exercise and traditional meals; Increase Traditional Teachings in all healthcare services • Need to heal the mind; People have poor coping [skills] • No sidewalk and not safe to be on highway • Heaving machinery (fumes) [on the roads] • When you do a workshop, people don't show up. Even if it is at the band hall. Offer a BINGO card when there's a community workshop to get people here	• Take the best from Indigenous medicines and integrate. Some people will share and some people don't trust to share • Access to ceremonies. Bring move people & more opportunities i.e. Goose ceremony not here since 1929. Walking out ceremonies • Bring in youth from Winnipeg to attend Sundance. Bring families and youth to Sundance • Being active in ceremony. Sundance and sweats for the third time this summer. [These ceremonies weren't] here for 100 years and it is growing • Family bond over food and laughter when there's more ceremony available • There is so much separation between the church and the cultural group. It's getting better though because trust is being built • Post Covid trauma and people being isolated • Kids suffering because of the isolation • Increased depression

Table 2 (continued)

Theme*(TDF domains)*	Community Feedback on Theme	Community Reflections on Theme
Community Movement Program *(Environmental context and resources; Knowledge (culture, condition); Beliefs about consequences; Intentions)*	• If we have a facility then people will come • It takes a long time to develop a habit. It needs to be consistent. Get 3–4 locals to do [the program] consistently • Need stretches and how to do [them] • Needs to be in-person. People were frustrated with the video [delivery of the program] and stopped going; Couldn't keep up with the person on the screen • Younger people also have back pain. People like to dance Jigs (elders, adults). Adapt the program so both [mobile and people with limited mobility] are involved at the same time Should be funded by a health program • Need food to get participants [to come out]	• People want big exercise facility with a track • The more we have here, [the more] people will be more apt to attend it and participate • Had some exercises equipment donated by YMCA but [there is] no space • Exercise builds self-esteem • More land-based programs. Go out on the land. Chop wood, go fish not just weights • Government starts a program [and] then ends it with no follow-up

* [] denotes words added by the research team to clarify the grammar or context of the feedback received during the community engagement sessions. The text is otherwise presented verbatim as it was documented on sticky notes during the engagement sessions

of people in Cross Lake. In dividing the landscape, the dam altered gathering, eating, communing, and sustaining family life through practices of trapping and hunting. Both the physical and symbolic distances introduced by the dam were described as exacerbating the experience of pain, increasing the effort required to seek care, and separating people from the land-based practices that helped them feel healthy and whole.

Discussion

We explored the views and perspectives of community leaders and clinicians regarding the implementation of the GSCI MoC and related services for people with spine symptoms in an Indigenous community in northern Manitoba. Framed within the TDF framework, themes emerged that considered the uniqueness of community culture, environment, needs, and challenges. Participant partners generally reported that the proposed new clinical spine service and movement program reflected the desires and needs for holistic, non-pharmacological options for healthcare rehabilitation services in Cross Lake.

Participants shared that the management of spine disorders and interprofessional collaboration could be improved with reduced managerial/administrative duties, new resources to orient new/visiting staff, follow-up appointments to deal with additional patient needs; and implementing an EMR incorporating a revised intake form listing spine care options ("*my care map*") to promote continuity of care [44]. Our study results provide evidence that customized educational material on the relative effectiveness and safety of chiropractic care are needed for clinicians to confidently refer to this new clinical service. These findings align with recommended approaches to building partnerships between community health representatives and Indigenous clinicians to emphasize a culturally safe approach through the development of case management meetings, training sessions and access to EMR to improve communication and teamwork, and referral process [45].

Community leaders expressed the importance of reflecting on and embracing the community's culture when developing and implementing a MoC. Future work will embed Indigenous methodology to support Indigenous self-determination in selecting MoC practices. There is a clear disconnect between pain expression by Indigenous peoples, and its assessment in clinical practice, where pain is often ignored, minimized, or disbelieved [3]. Culturally appropriate pain outcome measures are urgently needed. Therapeutic approaches should also integrate and accurately reflect an understanding of culturally specific physical, mental, emotional, and spiritual pain rather than broadly applying Western perspectives on pain [46]. To address the multi-dimensionality of pain experienced by those in Cross Lake, community leaders emphasized the cultural and organizational changes on the reserve that have evolved over time. Sedentary behaviour is a growing problem in all societies and is known to exacerbate spine symptoms [47]. Community leaders emphasized the importance of promoting mobility and movement programs, which is consistent with current guideline recommendations on the management of spine pain [12, 14–17].

Incorporating a traditional and culturally safe approach with input from and the presence of an Indigenous local Knowledge Keeper during sessions, offering transportation to residents, opening the community movement program to the youth, instilling the value of health at an early age, and making the program a social event, were important suggestions to help increase participation and retention, and sustain the program with the aim to prevent and reduce spine pain. Future work with community partners must prioritize local Indigenous peoples' ways of sharing knowledge [48] by partnering with Indigenous Knowledge Keepers to promote Indigenous oral wisdom [49] which could inform culturally safe and appropriate spine care services more broadly.

Barriers to high-value spine care include inadequate coverage for chiropractic services under the Non-Insured Health Benefits program, and a shortage of rehabilitation specialists including chiropractors in northern and rural communities [50]. Although chiropractic care will be offered at no cost to community members during the study period, advocating for governments to sustain such service is essential. Such sustainability is challenged by financial jurisdictional ambiguities between different government levels in Canada that breach Indigenous communities' rights to equitable healthcare [51, 52]. Funding is indispensable for maintaining infrastructure, reducing, and minimizing long-distance travel for community members, and improving cultural safety by training, and employing Indigenous staff and health professionals and training non-Indigenous staff [53]. Integrating rehabilitation across health systems, making it available to everyone whenever needed through public funding, would likely reduce overall costs and provide needed support for community members [54, 55].

We used the refined 2012 TDF framework to help understand attitudes and beliefs among partners, and to capture organisational culture/climate and knowledge of task environment [33] that could influence implementation of new services and programs. Despite revising the framework to enrich our understanding of Indigenous knowledge culture and environmental context and resources, our study found it inadequate in considering Indigenous cultural perspectives about healthcare

delivery. This inadequacy may stem from reductionist notions of health prevalent in biomedicine compared to Indigenous models of health [3]. Our modifications may serve as foundations for future revisions of the TDF framework to capture important contextual enablers and barriers when implementing initiatives in similar settings.

Feedback from the community engagement workshop reinforced what we learned during the interviews. Support is needed for upstream structural and systemic changes that prioritize Indigenous needs and way of life [53]. To be successful, the new service must focus on reconnection between people and providers, practices, and the land. We understand that the MoC must consider the integration of Indigenous and biomedical epistemologies in how we approach and promote strategies for movement and rehabilitation (e.g. suggesting condition-specific stretching alongside land-based strategies such as chopping wood). Services must also be attentive to the communal and intergenerational dimension of addressing pain, which includes promoting the sharing of knowledge and the return of Ceremony. The success of MoC depends on earning and maintaining trust. The MoC must demonstrate reliable, safe care that is anchored in an appreciation of how spine care can play a role in reconnecting the community to itself, to its land, and to feelings of resiliency. Ongoing community leaders' consultations and further cultural adaptations of the MoC and proposed services are planned [48].

Strengths and Limitations

Study strengths include: 1) using a validated framework [33, 34] to guide our interview questions and the adaptions made to capture cultural dimensions; 2) early engagement with community leaders; and 3) community member consultation to explore findings and for interpretation accuracy. A limitation of the study was our decision to adapt the TDF. Using an Indigenous framework may have altered our interview guide and led to exploring different Indigenous experiences with healthcare and its delivery [56], which may have created conditions for different results and forms of reflection for the research team. The present data was collected from a purposive sample and may not reflect perspectives of all community members and/or all staff at the CLNS. The interviewers and coders were settler allies which may have impacted interpretation, however the assessors independently coded and reached consensus and used reflexivity during the study. Saturation was achieved for most domains, but not necessarily for all based on code frequency.

The results were shared with our partners and community members; however, only sixteen members attended the sharing workshop. Inclement weather may have contributed to the number of participants. We recognize that the lived experiences of people in Cross Lake may not be transferable to other Indigenous communities.

Conclusion

Community leaders and clinicians expressed optimism about and motivation for utilizing the MoC, and the proposed new clinical service and community movement program. They emphasized concrete prerequisites such as community engagement and education, continuing education for clinicians, and organizational changes at the CLNS. While the TDF provided a viable scaffold, further cultural adaption is needed to appropriately assess local health systems and care practices in Indigenous communities in Canada.

Abbreviations

CLNS	*Cross Lake Nursing Station*
CLBOI	Cross Lake Band of Indians
GSCI	Global Spine Care Initiative: https://www.globalspinecareinitiative.org/.
MoC	Model of Care
MSK	Musculoskeletal
RA	Research Assistant
SDG	Sustainable Development Goals
TDF	Theoretical Domain Framework
WHO	World Health Organization
WSC	World Spine Care: https://www.worldspinecare.org/.
WSCC	World Spine Care Canada: https://www.worldspinecare.org/canada

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s43058-024-00636-2.

Supplementary Material 1.

Supplementary Material 2.

Supplementary Material 3.

Supplementary Material 4.

Supplementary Material 5.

Acknowledgements

We thank Mr. George Muswagon and Mrs. Helga Hamilton for their assistance with the description of the setting.

Authors' contributions

A.B., S.P., D.K.G., P.T., J.W., S.M., J.L, C.G., S.H. developed the concept and design with input from all authors. D.A. M. Chief., D.Z. M., H.H., M.S., M.A.G., R.S., and J.W. provided cultural guidance and context. N.R., E.B., S.M., and A.B., wrote the main manuscript text and prepared additional files with input from all authors. All authors critically revised the manuscript for important intellectual content. J.M. and S.P., provided administrative support. A.B. supervised the team.

Funding

This project received financial support from Health Canada Substance Use and Addictions Program (agreement # 2223 HQ 000126), The Canadian Chiropractic Research Foundation (CCRF), The Canadian Chiropractic Association (CCA), and The Skoll Foundation.

Availability of data and materials
The data that support the findings of this study are available from the University of Manitoba, but restrictions apply to the availability of these data, which were used under the signed research agreement for the current study and so are not publicly available. The data are, however, available from the corresponding author upon reasonable request and with the permission of Cross Lake Band, Cross Lake, Northern Manitoba.

Declarations

Ethics approval and consent to participate
A research agreement between Cross Lake Band, WSC, University of Manitoba (U.M.) and Université du Québec à Trois-Rivières (UQTR) was signed on July 7, 2022. Ethical approval was received from the Research Ethics Boards at the U.M. (#HE2022-0248), UQTR (CER23-295.10.01), and the Canadian Memorial Chiropractic College (#REB 2212X01).

Consent for publication
Consent for publication was obtained from all participants.

Competing interests
The authors declare that they have no competing interests. The senior author AB (the manuscript's guarantor) affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; and that no important aspects of the study have been omitted.

Author details
[1]Faculty of Kinesiology and Recreation Management, Frank Kennedy Centre, University of Manitoba, University Crescent University of Manitoba (Fort Garry Campus), Winnipeg, MB, Canada. [2]Graduate Education and Research, Canadian Memorial Chiropractic College, 6100 Leslie Street, Toronto, ON M2H 3J1, Canada. [3]Département Chiropratique, Boulevard Des Forges, Université du Québec À , Trois-Rivières, Trois-Rivières, Canada. [4]Ontario Tech University, 2000 Simcoe Street North, Oshawa, ON L1G 0C5, Canada. [5]Cross Lake Health Services, Cross Lake, P.O. Box 190, Manitoba R0B 0J0, Canada. [6]World Spine Care Canada, 3000 Langstaff Road Unit 15, Concord, ON L4K 4R7, Canada. [7]Department of Family and Community Medicine, University of Toronto, 500 University Avenue, 5 Floor, Toronto, ON M5G 1V7, Canada. [8]Cross Lake Band, Cross Lake, No. 276 Pimicikamak Okimawin, P.O Box 10, Cross Lake, MB R0B0J0, Canada. [9]Cross Lake Nursing Station, Box 160 Cross Lake, Manitoba R0B 0J0, Canada. [10]University of California, Irvine, Irvine, CA 92697, USA. [11]World Spine Care, 17602 17 Street, Suite 102-263, Tustin, CA 92780, USA. [12]School of Physical and Occupational Therapy, Faculty of Medicine and Health Sciences, McGill University, 3630 Prom Sir-William-Osler, Montréal, Québec H3G 1Y5, Canada.

Received: 13 May 2024 Accepted: 7 September 2024
Published online: 17 September 2024

References

1. Government of Canada. Indigenous Peoples and communities. 2022 [cited 2024 January 28]; Available from: https://www.rcaanc-cirnac.gc.ca/eng/1100100013785/1529102490303.
2. Kolahdooz F, Nader F, Yi KJ, Sharma S. Understanding the social determinants of health among Indigenous Canadians: priorities for health promotion policies and actions. Glob Health Action. 2015;8(1):27968.
3. Bailey NGN, Knott R, Grenier G, Craig KD, Kramer, JLK. Physical pain among Indigenous Peoples in Canada: a scoping review. Can J Anaesth. 2023;70(6):1047–63.
4. Wylie L, McConkey S. Insiders' Insight: Discrimination against Indigenous Peoples through the Eyes of Health Care Professionals. J Racial Ethn Health Disparities. 2019;6(1):37–45.
5. Tang SY, Browne AJ. 'Race' matters: racialization and egalitarian discourses involving Aboriginal people in the Canadian health care context. Ethn Health. 2008;13(2):109–27.
6. Browne AJ, Fiske JA. First Nations women's encounters with mainstream health care services. West J Nurs Res. 2001;23(2):126–47.
7. World Health Orgnization. Musculoskeletal health - Fact sheets. 2022 [cited 2023 January 28]; Available from: https://www.who.int/news-room/fact-sheets/detail/musculoskeletal-conditions.
8. Ferreira ML, de Luca K, Haile LM, Steinmetz JD, Culbreth GT, Cross M, et al. Global, regional, and national burden of low back pain, 1990–2020, its attributable risk factors, and projections to 2050: a systematic analysis of the Global Burden of Disease Study 2021. Lancet Rheumatol. 2023;5(6):e316–29.
9. Czyzewski K. Colonialism as a broader social determinant of health. Int Indig Policy. 2011;2(1):1–14.
10. Prime Minister of Canada Justin Trudeau. Supporting and improving Indigenous-led health care for First Nations in British Columbia. April 14, 2023 West Vancouver, British Columbia 2023 [cited 2024 January 28]; Available from: https://www.pm.gc.ca/en/news/news-releases/2023/04/14/supporting-and-improving-indigenous-led-health-care-first-nations.
11. Kim PJ. Social Determinants of Health Inequities in Indigenous Canadians Through a Life Course Approach to Colonialism and the Residential School System. Health Equity. 2019;3(1):378–81.
12. Chou R, Côté P, Randhawa K, Torres P, Yu H, Nordin M, et al. The Global Spine Care Initiative: applying evidence-based guidelines on the non-invasive management of back and neck pain to low- and middle-income communities. Eur Spine J. 2018;27(Suppl 6):851–60.
13. Haldeman S, Nordin M, Chou R, Côté P, Hurwitz EL, Johnson CD, et al. The Global Spine Care Initiative: World Spine Care executive summary on reducing spine-related disability in low- and middle-income communities. Eur Spine J. 2018;27(6):776–85.
14. Bussières A, Stewart G, Al Zoubi F, Decina P, Descarreaux M, Hayden J, et al. The treatment of whiplash and neck pain associated disorders: Canadian Chiropractic Guideline Initiative clinical practice guidelines. J Manipulative Physiol Ther. 2016;39(8):523–604.
15. Bussières A, Cancelliere C, Ammendolia C, Comer CM, Zoubi FA, Châtillon CE, et al. Non-surgical interventions for lumbar spinal stenosis leading to neurogenic claudication: A clinical practice guideline. J Pain. 2021;22(9):1015–39.
16. World Health Orgnization. WHO guideline for non-surgical management of chronic primary low back pain in adults in primary and community care settings. Geneva: World Health Organization. Licence: CC BY-NC-SA 3.0 IGO 2023. Available from: https://iris.who.int/bitstream/handle/10665/374726/9789240081789-eng.pdf.
17. Busse JW, Craigie S, Juurlink DN, Buckley DN, Wang L, Couban RJ, et al. Guideline for opioid therapy and chronic noncancer pain. CAMJ. 2017;189(18):E659–66.
18. Skivington K, Matthews L, Simpson SA, Craig P, Baird J, Blazeby JM, et al. A new framework for developing and evaluating complex interventions: update of Medical Research Council guidance. BMJ. 2021;374: n2061.
19. Bussières AE, Passmore S, Kopansky-Giles D, Tavares P, Ward J, Ladwig J, et al. Assessing the readiness and feasibility to implement a model of care for spine disorders and related disability in Cross Lake, an Indigenous community in northern Manitoba, Canada: A research protocol. Chiropractic Manual Ther (Submitted), 2024.
20. Levac L, McMurtry L, Stienstra D, Baikie G, Hanson C, Mucina D. Learning across indigenous and Western knowledge systems and intersectionality: reconciling social science research approaches, S.S.a.H.R.C.o.C. (SSHRC), Editor. Ontario: University of Guelph; 2018. p. 40.
21. Snow K. What does being a settler ally in research mean? A graduate students experience learning from and working within Indigenous research paradigms. Int J Qual Methods. 2018;17(1):1609406918770485.
22. Government of Canada, Registered Population, Cross Lake Band of Indian, F.N. Crown-Indigenous Relations and Northern Affairs Canada, Editor. 2023. Available from: https://www.rcaanc-cirnac.gc.ca/eng/1100100013785/1529102490303.
23. Cross Lakes Health Services. 2023. [cited 2024 March 29]; Available from: https://crosslakehealth.ca/about.htm.
24. Webb D, Stutz S, Hiscock C, Bowra A, Butsang T, Tan S, et al. Indigenous Cultural Safety Trainings for Healthcare Professionals Working in Ontario, Canada: Context and Considerations for Healthcare Institutions. Health Services Insights. 2023;16:11786329231169940.
25. Reis FJJ, Nijs J, Parker R, Sharma S, Wideman TH. Culture and musculoskeletal pain: strategies, challenges, and future directions to develop culturally sensitive physical therapy care. Braz J Phys Ther. 2022;26(5):100442.

26. Mittinty MM, Hedges J, Jamieson L. Building evidence to reduce inequities in management of pain for Indigenous Australian people. Scand J Pain. 2022;22(2):356–64.
27. Campbell, F, Hudspith M, Choinière M, El-Gabalawy H, Laliberté J, Sangster M, et al. Action plan for pain in Canada. The Canadian pain task force. Ottawa: Health Canada; 2021. p. 20.
28. Patton M, Research Q, Methods E, Theory I, Practice. Forth, editors. Saint Paul. SAGE Publications, Inc: MN; 2014. p. 832.
29. Smylie J, Marsden N, Star L, Gahagan J, Zarowsky C, Mykhalovskiy E, et al. Requirement for meaningful engagement of First Nations, Inuit, Métis, and Indigenous Peoples in publications about them. Can J Public Health. 2020;111(6):826–30.
30. O'Cathain A, Murphy E, Nicholl J. Three techniques for integrating data in mixed methods studies. BMJ. 2010;341: c4587.
31. Conte KP, et al. Producing knowledge together: a participatory approach to synthesising research across a large-scale collaboration in Aboriginal and Torres Strait Islander health. Health Research Policy and Systems. 2024;22(1):3.
32. Patton, MQ. Qualitative analysis and interpretation, in: qualitative research and evaluation methods. CA: Sage Publications Inc.; 2002. p. 541.
33. Cane J, O'Connor D, Michie S. Validation of the theoretical domains framework for use in behaviour change and implementation research. Implementation Sci. 2012;7(1):37.
34. Atkins L, Francis J, Islam R, O'Connor D, Patey A, Ivers N, et al. A guide to using the Theoretical Domains Framework of behaviour change to investigate implementation problems. Implementation Sci. 2017;12(1):77.
35. Bussières A, Patey A, Francis J, Sales A, Grimshaw J, et al. Identifying factors likely to influence compliance with diagnostic imaging guideline recommendations for spine disorders among chiropractors in North America: a focus group study using the Theoretical Domains Framework. Implementation Sci. 2012;7(1):82.
36. Bussières A, Al Zoubi F, Quon J, Ahmed S, Thomas A, Stuber K, et al. Fast tracking the design of theory-based KT interventions through a consensus process. Implementation Sci. 2015;10(1):18.
37. Eilayyan O, Thomas A, Hallé MC, Ahmed S, Tibbles AC, Jacobs C, et al. Promoting the use of self-management in novice chiropractors treating individuals with spine pain: the design of a theory-based knowledge translation intervention. BMC Musculoskelet Disord. 2018;19(1):328.
38. French SD, O'Connor DA, Green SE, Page MJ, Mortimer DS, Turner SL, et al. Improving adherence to acute low back pain guideline recommendations with chiropractors and physiotherapists: the ALIGN cluster randomised controlled trial. Trials. 2022;23(1):142.
39. Cancelliere C, Sutton D, Côté P, French SD, Taylor-Vaisey A, Mior SA. Implementation interventions for musculoskeletal programs of care in the active military and barriers, facilitators, and outcomes of implementation: a scoping review. Implementation Sci. 2019;14(1):82–82.
40. Norton TC, Rodriguez DC, Willems S. Applying the Theoretical Domains Framework to understand knowledge broker decisions in selecting evidence for knowledge translation in low- and middle-income countries. Health Res Policy Syst. 2019;17(1):60.
41. Verhoef M, Mulkins A, Boon H. Integrative health care: How can we determine whether patients benefit? J Altern Comp Med. 2005;11(Suppl 1):57–65.
42. Ellingson LL, Engaging crystallization in qualitative research - An introduction. Santa Clara University. USA: SAGE Publications Inc; 2008.
43. Gale NK, Heath G, Cameron E, Rashid S, Redwood S. Using the framework method for the analysis of qualitative data in multi-disciplinary health research. BMC Med Res Methodol. 2013;13:117.
44. Hofer A, McDonald M. Continuity of care: why it matters and what we can do. Aust J Prim Health. 2019; 25(3):214–8.
45. King C, Goldman A, Gampa V, Smith C, Muskett O, Brown C, et al. Strengthening the role of Community Health Representatives in the Navajo Nation. BMC Public Health. 2017;17(1):348.
46. Kovach M. Conversation Method in Indigenous Research. First Peoples Child Fam Rev. 2010;5(1):40–8.
47. Baradaran Mahdavi S, Riahi R, Vahdatpour B, Kelishadi R. Association between sedentary behavior and low back pain; A systematic review and meta-analysis. Health Promot Perspect. 2021;11(4):393–410.
48. Morton Ninomiya ME, Maddox R, Brascoupé S, Robinson N, Atkinson D, Firestone M, et al. Knowledge translation approaches and practices in Indigenous health research: A systematic review. Soc Sci Med. 2022;301:114898.
49. Cunsolo Willox A, Harper SL, Edge VL. Storytelling in a digital age: digital storytelling as an emerging narrative method for preserving and promoting indigenous oral wisdom. Qual Res. 2013;13(2):127–47.
50. Lepp B. Co-development of distinctions-based Indigenous health legislation submission. Canadian Chiropractic Association. 2021. p. 10.
51. Gabel C, Demaio P, Powell A. Towards healthier Aboriginal health policies? Navigating the labyrinth for answers. J Indig Wellbeing. 2017;2(1):47–59.
52. Assembly of First Nations. The First Nations Health Transformation Agenda. 2017. p. 125. Available from:https://scoinc.mb.ca/wp-content/uploads/2020/07/FNHTA-AFN.pdf.
53. Stefanon BM, Tsetso K, Tanche K, Morton Ninomiya ME. Effective health and wellness systems for rural and remote Indigenous communities: a rapid review. Int J Circumpolar Health. 2023;82(1):2215553.
54. World Health Organization. Rehabilitation in health systems: guide for action. Geneva: WHO; 2019. Licence: CC BY-NC-SA 3.0 IGO. Available from: https://www.who.int/publications/i/item/9789241515986.
55. World Health Organization. Strengthening rehabilitation in health systems. Geneva: WHO; 2017. Licence: CC BY-NC-SA 3.0 IGO. Availble from: https://iris.who.int/bitstream/handle/10665/254506/9789241549974-eng.pdf?sequence=8.
56. Indigenous Healthcare Quality Leads. Indigenous healthcare quality framework. Ongomiizwin Indigenous Institute of Health,Healing and the George and Fay Yee Centre for Healthcare Innovation. University of Manitoba; 2022. p. 20. Available from: https://umanitoba.ca/ongomiizwin/sites/ongomiizwin/files/2022-10/Indigenous%20Health%20Care%20quality%20framework.pdf.

Publisher's Note