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Original Research

Theory-Informed Development of a Multicomponent Intervention to Implement Clinical Practice Guideline Recommendations in the Management of Shoulder Pain

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ABSTRACT

Objective. Suboptimal primary health care management of shoulder pain has been reported in previous studies. Implementing clinical practice guidelines (CPGs) recommendations using a theoretical approach is recommended to improve shoulder pain management. This study aims to identify determinants of implementing recommendations from shoulder CPGs to help develop an intervention based on the identified determinants.

Methods. Family physicians and physical therapists managing patients with shoulder pain in primary care were invited to participate in a qualitative study to identify determinants to implementing recommendations from shoulder CPGs. The Theoretical Domains Framework (TDF) was used to inform the creation of the semi-structured interview guide and for deductive coding of transcriptions. The determinants were mapped to intervention functions and behavior change techniques (BCT) using the Behavior Change Wheel method and strategies for implementing CPGs recommendations were identified.

Results. Interviews were conducted with 16 family physicians and 19 physical therapists. We identified 12 barriers and 6 facilitators within 7 TDF domains: knowledge, skills, beliefs about capabilities, beliefs about consequences, intentions, environmental context and resources, and social influence. We identified 6 intervention functions and 12 BCT addressing the relevant determinants. The 11 implementation strategies identified include the development and distribution of educational material, interactive educational outreach visits, and audit and feedback. Other components to consider are the identification and preparation of champions in primary care clinical settings, revision of professional roles, and creation of interdisciplinary clinical teams.

Conclusions. The identification of barriers and facilitators to implementing recommendations from shoulder CPGs allowed us to select implementation strategies at individual and organizational levels.

Impact. The implementation strategies will be adapted to specific primary care contexts in consultation with stakeholders and operationalized into a multicomponent implementation intervention. Implementing the intervention has the potential to improve shoulder pain management in primary care and facilitate the use of evidence-based recommendations from CPGs.

Key words: Behavior Change Wheel; Clinical Practice Guidelines; Implementation Science; Knowledge Translation; Musculoskeletal; Primary Care; Recommendations; Shoulder; Theoretical Domains Framework

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INTRODUCTION

Shoulder pain is the third most common musculoskeletal disorder and will affect up to 55% of adults in a lifetime.[1,2] Most patients will seek help in primary care for their shoulder pain and numerous studies have assessed the appropriateness of shoulder pain management in primary care by family physicians and physical therapists.[3–22] These studies have reported management not concordant with evidence-based recommendations from high-quality clinical practice guidelines (CPGs).[3–22] For example, overuse of diagnostic imaging tests and inappropriate referrals to musculoskeletal specialists as well as the use of low-value medical and rehabilitation treatments were reported.[3–22] Our team has recently conducted a similar study in the province of Quebec in Canada and similar results were also found.[14] Recent studies conducted in the United States and Canada have reported that over 30% of diagnostic imaging tests references for musculoskeletal pain, including shoulder pain, are considered inappropriate. These unnecessary imaging tests represent over 20% of all annual imaging costs.[10,23,24] Furthermore, additional costs may be attributable to productivity losses, and the inappropriate use of medical imaging can prevent individuals from receiving timely examinations.[25–27]

In this context, improving the uptake of recommendations from shoulder CPGs in primary care is dearly needed to improve its management.[28] However, understanding the determinants (ie, barriers and facilitators) of implementing recommendations is important to develop an implementation intervention that effectively changes clinical practice.[29] To our knowledge, no studies have identified the determinants of the implementation of evidence-based recommendations from shoulder pain high-quality CPGs in primary care using a theoretical approach, such as the Theoretical Domains Framework (TDF).

Moreover, passive dissemination of CPGs recommendations (eg, only publishing CPGs) is unlikely to be very effective as several authors have reported failure to effectively change clinicians' practice.[30,31] More active interventions, such as clinical decision support, implementation of clinical champions, or feedback to clinicians, are more likely to change clinicians' behavior.[32] Based on determinants identified with the TDF, we can use the Behavior Change Wheel (BCW) to identify intervention functions, behavior change techniques (BCT) and implementation strategies to develop a multicomponent intervention for implementing the recommendations. However, in the few studies covering the development and implementation of shoulder pain recommendations, the rationale for the selection and development of implementation strategies was not explicit and did not rely on a stepwise approach using validated frameworks.[33,34]

Thus, the aims of the present study are (1) To use the TDF to identify the determinants of the efficient implementation of recommendations from CPGs covering shoulder pain management and (2) To use the BCW method for developing an intervention to implement recommendations from CPGs covering shoulder pain management, based on the determinants identified within TDF domains.

METHODS

We used a comprehensive 2-phase approach to (1) identify the determinants of implementing shoulder pain management recommendations and (2) identify implementation strategies for developing a multicomponent intervention to improve shoulder pain management.

Phase 1: Identification of Determinants for the Efficient Implementation of Recommendations

Framework

The TDF was used to understand clinicians' behavior and identify the determinants of implementing recommendations from shoulder CPGs.[35] The TDF comprises 14 theoretical domains including individual determinants such as knowledge, skills, social and professional roles and identity, beliefs about consequences and capabilities, motivation and goals, emotions as well as memory, attention and decision processes of the primary care clinicians. The TDF also encompasses organizational determinants: social influences and environmental context and resources.[35] The TDF domains are linked to Capability – Opportunity- Motivation – Behavior (COM-B) components, which are the core of the BCW. The tenet of the model is that Capability, Opportunity and Motivation are essential components of behavior change and are used to identify what needs to change.[36]

Study Design

Our qualitative study follows the Standards for Reporting Qualitative Research checklist.[37] We received approval from the CIUSSS-de-l'Est-de-l'Île de Montréal (2021–2224) Health Research Ethics Committee in Montreal, Canada. All participants provided verbal and written informed consent. The study complies with the Declaration of Helsinki.

Sampling and Recruitment of Participants

Primary care clinicians working in the province of Quebec, Canada were eligible to participate if they: (1) were working in a primary care setting such as a family medicine group, a private clinic, or an emergency department; (2) reported managing patients with shoulder pain; and (3) were able to orally communicate in French. Participants were recruited from the respondents of the previous survey study conducted by our team[14] and through social media outreach. In our previous survey study, we used a convenience sample of family physicians and physical therapists who were recruited through invitations sent via email lists of the physical therapists' professional board, a provincial primary care research network, and selected medical and physical therapy clinics.[14] We sent an email invitation with information regarding the project to physicians practicing in university-affiliated Family Medicine Groups to invite them to participate in the project. Interested participants contacted the research team by email.

Data Collection

We developed a semi-structured interview guide available in Supplementary Material 1. Questions were developed based on TDF domains' definitions and using a practical guide aimed to guide researchers applying the TDF to assess implementation determinants.[35,38,39] Recommendations from high-quality CPGs covering the management of common shoulder disorders were presented to participants to assess determinants of their use in clinical practice (Suppl. Material 2).[40,41] The first author (V.L.) developed the interview guide that was reviewed by research team members with clinical experience managing shoulder pain or conducting research on that topic (F.D., K.P., A.H., K.K., D.Z.). Small focus groups of 2 to 4 participants or individual interviews were conducted virtually using Zoom Meeting Education, a secure platform

using end-to-end encryption. Either small focus groups or individual interviews were conducted depending on schedule constraints and the common availability of some participants. Interviews were conducted by a physical therapist identifying as a woman who is also a PhD candidate with 7 years of clinical experience in the management of shoulder pain (V.L.). Participants filled out a short questionnaire on sociodemographic and practice-related characteristics.

Data Analysis

Descriptive statistics were summarized for demographic and clinical characteristics of family physicians and physical therapists. Interviews were recorded using the Zoom platform and transcribed verbatim. Nine interviews were transcribed by 1 author (V.L.) and 7 were transcribed by a professional transcriber. The accuracy of transcriptions was verified by V.L. Transcriptions were analyzed using deductive thematic analysis based on Braun and Clarke's 6-step approach: (1) Reading and familiarizing with data; (2) Generating initial codes; (3) Searching for themes; (4) Reviewing themes; (5) Defining and naming themes; and (6) Producing the report.[42] We have used a constructivist epistemological approach for the study, considering that the participants' perceptions and experiences shape the reality they describe, and knowledge is co-constructed during the interviews.[43] A coding guide based on TDF domain definitions was created.[35] Two members of the team (V.L. and M.M.) both independently coded 2 transcripts and compared and discussed their initial codes to develop common codes and codebooks. VL then proceeded to code and analyze all other transcripts (n = 14) using the NVivo 12 (QSR International Pty Ltd.) software.

Deductive and Inductive Coding

Transcripts were coded using a deductive and inductive approach. The transcripts were coded using a deductive approach based on established definitions of TDF domains. Within the TDF domains, subthemes were formulated inductively. We grouped the subthemes within each domain into overarching themes. An analysis was carried out by types of participants (physical therapists and family physicians). An explanatory matrix was created that summarized codes, themes, and relevant quotes by type of participants, and classification of themes as barriers or facilitators. The themes were determined as a barrier or a facilitator, according to the declarations of most participants. If a barrier or facilitator was only mentioned by 1 type of professional, this was considered and mentioned in Table 1. To ensure the credibility of the results, the first author in charge of the analysis (V.L.) held regular consultations with a qualitative researcher experienced in the application of TDF and BCW methodology (D.Z.).[44,45] Disagreements were discussed by comparing quotes with the operational definitions of the domains and a consensus was reached. Relevant citations that were included in the manuscript were translated from French into English by a professional translator.

Phase 2: Identification of Intervention Functions, Behavior Change Techniques and Intervention Components

Frameworks

The BCW allows mapping the determinants identified with the TDF to intervention functions and BCT to inform implementation intervention development.[36,46] The intervention functions from the BCW represent the general mechanisms by which an intervention can change behavior (education, persuasion, incentivization, coercion, training, restriction, environmental restructuring, modelling and enablement).[46] The TDF domains and intervention functions can be linked to several specific BCT.[47] BCT are reproducible components that correspond to the active ingredient of an intervention that has the potential to change behavior.[48]

Selecting Implementation Strategies

TDF domains and associated COM-B components were mapped to intervention functions and BCT using the matrix established by Michie and Atkins and the Theory and Technique Tool available online.[36,49,50] Based on the determinants identified in Phase 1 and associated BCT, implementation strategies were selected by members of the research team with clinical experience in shoulder pain management (V.L., D.Z., and F.D.). The implementation strategies were selected from the Expert Recommendations for Implementing Change (ERIC) project compilation by Powell et al.[51] The complementarity between the BCT and the implementation strategies was verified based on the analysis by McHugh et al.[48] The steps of data collection and analysis are summarized in Figure 1.

Role of the Funding Source

The funders played no role in the design, conduct, or reporting of this study.

RESULTS

Sample Characteristics

Sixteen family physicians (6 focus groups and 2 individual interviews) and 19 physical therapists (7 focus groups and 1 individual interview) participated in the project. Regarding data saturation, a systematic review concluded that this was generally achieved after 9 to 17 individual interviews.[52] Our sample size of 16 family physicians and 19 physical therapists exceeds this standard. Moreover, after analysis, we concluded that no new concepts emerged from the analysis of the last 2 interviews of each category of participants and we did not need to recruit additional participants. The interviews had a mean duration of 79 ± 11 minutes. The sociodemographic and practice-related characteristics of participants are presented in Table 2.

Phase 1: Identification of Barriers and Facilitators

We identified 12 barriers and 6 facilitators for a total of 17 determinants. One determinant related to beliefs about capabilities was coded as both a barrier and a facilitator because opposite opinions were mentioned by participants. These determinants covered 7 TDF domains: knowledge, skills, beliefs about capabilities, beliefs about consequences, intentions, environmental context and resources, and social influence. The determinants are presented in Table 1 and explained below. Corresponding quotes from the participants are presented in Supplementary Material 3.

Capability

Regarding the capability of clinicians to use clinical recommendations, 2 barriers were included in the TDF knowledge domain, and 2 determinants were related to family physicians' and physical therapists' skills.

Table 1. Mapping of Determinants With Intervention Functions, Behavior Change Techniques, and Implementation Strategies[a]

COM-B Components	TDF Domains	Determinants (Barriers or Facilitators)	Intervention Function/BCT	Implementation Strategies
Capability	Knowledge	Lack of awareness of most FP and some PT about the existence of shoulder CPGs. (Barrier) Lack of knowledge of FP and PT of some recommendations from CPGs (imaging, referral to medical MSK specialists and infiltration indications). (Barrier)	**Intervention function:** Education **BCT:** – Instruction on how to perform the behavior – Information about health consequences – Information about social and environmental consequences – Feedback on behavior	**1- Development and distribution of educational material:** – Sending electronic material with the recommendations from high-quality shoulder CPGs and health and social consequences of applying the recommendations (eg, email, websites, podcasts, and social media accounts to follow). **2- Conduct interactive educational outreach visits:** – Presentation of the recommendations by an expert in shoulder pain management with information on the positive health and social consequences of applying the recommendations. **3- Audit and provide feedback:** – Perform a chart audit of patients who consulted for shoulder pain with indicators related to clinical evaluation, diagnostic imaging, and medical MSK specialist referral and care offered to provide feedback to clinicians.
	Skills	Some FP are not able to evaluate the patient according to recommendations from CPGs. (Barrier) FP and PT report that communication skills are needed to facilitate discussion with patients when their expectations are not evidence-based. (Facilitator)	**Intervention function:** Training **BCT:** – Instruction on how to perform the behavior – Behavioral practice/rehearsal	**2- Conduct interactive educational outreach visits:** – Interactive clinical examination workshops with real clinical patients facilitated by an expert in shoulder management (workshop 1). – Interactive motivational interviewing workshops facilitated by an expert trainer to help clinicians manage patients' motivation and to address communication skills (workshop 2). – Interactive shared-decision-making workshop facilitated by an expert to help clinicians manage patients' expectations and to address communication skills (workshop 2).

(*Continued*)

Table 1. Continued

COM-B Components	TDF Domains	Determinants (Barriers or Facilitators)	Intervention Function/BCT	Implementation Strategies
Opportunity	Environmental context and resources	FP report a lack of time with patients with shoulder pain for clinical evaluation, education, and treatment, especially in patients with chronic pain, patients with multimorbidity, and patients with psychosocial issues. (Barrier) FP and PT report a lack of time to search for/review recommendations from CPGs. (Barrier) PT report patients' lack of access to family physicians for a diagnostic imaging referral. (Barrier) PT and FP report patients' lack of access to publicly funded physical therapy. (Barrier) PT have the expertise to manage shoulder pain independently using recommendations from CPGs according to most FP and PT. (Facilitator) FP and PT lack of entry to practice MSK education. (Barrier)	**Intervention functions:** – Enablement – Environmental restructuring **BCT:** – Social support – Restructuring the social environment – Restructuring the physical environment	**4- Develop and implement tools for quality monitoring:** – Provide the clinician with an evaluation form to facilitate clinical evaluation. – Provide the clinician with decision aids tools to facilitate decision-making in shoulder pain management. **5- Prepare patients to be active participants:** – Patient oriented information handouts and posters in the waiting room with information about recommendations and links to educational resources (eg, websites, podcasts, and social media accounts to follow) to facilitate patients' education. **6- Identify and prepare champions:** Identify a credible clinician expert in shoulder pain management as a resource person within the clinics: – To facilitate the relay of educational material – One-on-one coaching for clinical evaluation – One-on-one coaching for care offered for shoulder pain with real clinical patients and problem solving of complex pain **7- Create new interprofessional clinical teams:** – Create care pathways between physical therapists and family medicine groups to facilitate referral and access to investigations for patients. – Addition of PT in primary care medical clinics. **8- Revise professional roles:** – In medical clinics with a physical therapist, organize care so the physical therapist would be the first contact provider to evaluate and manage the patient instead of the FP. – Task substitution or task sharing between professionals within clinics (eg, training of residents). **9- Develop academic partnership:** – Partner with physical therapy programs and medicine university programs to integrate in their curricula and residency/internship recommendations from CPGs for shoulder pain management.

(*Continued*)

Table 1. Continued

COM-B Components	TDF Domains	Determinants (Barriers or Facilitators)	Intervention Function/BCT	Implementation Strategies
	Social influences	Patients' expectations, beliefs, or motivation can hinder the use of evidence-based recommendations from CPGs according to FP and PT. (Barrier) Interprofessional collaboration between FP and PT in shoulder pain management facilitates the use of evidence-based recommendations, according to FP and PT. (Facilitator)	**Intervention functions:** – Enablement – Environmental restructuring **BCT:** – Social support – Restructuring the social environment – Restructuring the physical environment – Adding objects to the environment	**5- Prepare patients to be active participants:** – Patient oriented information handout and posters in the waiting room with information about recommendations and links to educational resources (eg, websites, podcasts, and social media accounts to follow) to facilitate patients' education **6- Identify and prepare champions:** Identify a credible clinician expert in shoulder pain management as a resource person within the clinics: – To facilitate the relay of educational material – One-on-one coaching for clinical evaluation – One-on-one coaching for care offered for shoulder pain with real clinical patients and problem solving of complex pain **10- Promote network weaving:** – Identify and build on existing relationships and networks within and outside clinics for information sharing, and collaborative problem-solving using evidence-based recommendations from CPGs. – Interprofessional education between providers within the network.
Motivation	Beliefs about capabilities	Different levels of confidence of FP and PT in managing shoulder pain using recommendations from CPGs (diagnostic imaging and medical specialist referral indications, active rehabilitation treatment). (Barrier and Facilitator)	**Intervention functions:** – Education – Enablement **BCT:** – Instruction on how to perform the behavior – Problem solving – Restructuring the social environment	**6- Identify and prepare champions:** Identify a credible clinician expert in shoulder pain management as a resource person within the clinics: – To facilitate the relay of educational material – One-on-one coaching for clinical evaluation – One-on-one coaching for care offered for shoulder pain with real clinical patients and problem solving of complex pain
	Beliefs about consequences	Using recommendations from CPGs can optimize the optimal use of health care resources, save costs, improve patients' outcomes, standardize the approach, and increase the credibility of the professional according to FP and PT. (Facilitator) Using recommendations from CPGs may hinder clinical reasoning ("one-size fits all" approach) according to FP and PT. (Barrier) By using some recommendations from CPGs (no referral for diagnostic imaging), some FP and PT believe they could miss a serious condition, if present. (Barrier)	**Intervention functions:** – Education – Persuasion **BCT:** – Information about health consequences – Information about social and environmental consequences – Salience of consequences – Pros and cons	**2- Conduct educational outreach visits:** – Interactive workshops with discussion about the pros and cons and consequences of applying the recommendations in clinical practice.
	Intentions	Lack of interest and motivation of FP and PT in searching recommendations from shoulder CPGs, to undergo training in musculoskeletal practice, and to change practice. (Barrier)	**Intervention functions:** – Education – Incentivization **BCT:** – Information about health consequences – Incentive	**2- Conduct educational outreach visits:** – Interactive workshops with discussion about the pros and cons of applying the recommendations in clinical practice. **11- Alter incentive/allowance structures:** – Allow continuing education credits for educational meetings and autonomous research of scientific evidence. – Allow paid time for autonomous evidence-based training.

[a]BCT = Behavior Change Techniques; COM-B = Capability – Opportunity – Motivation – Behavior; CPG = clinical practice guidelines; FP = family physicians; MSK = musculoskeletal; PT = physical therapists; TDF = Theoretical Domains Framework.

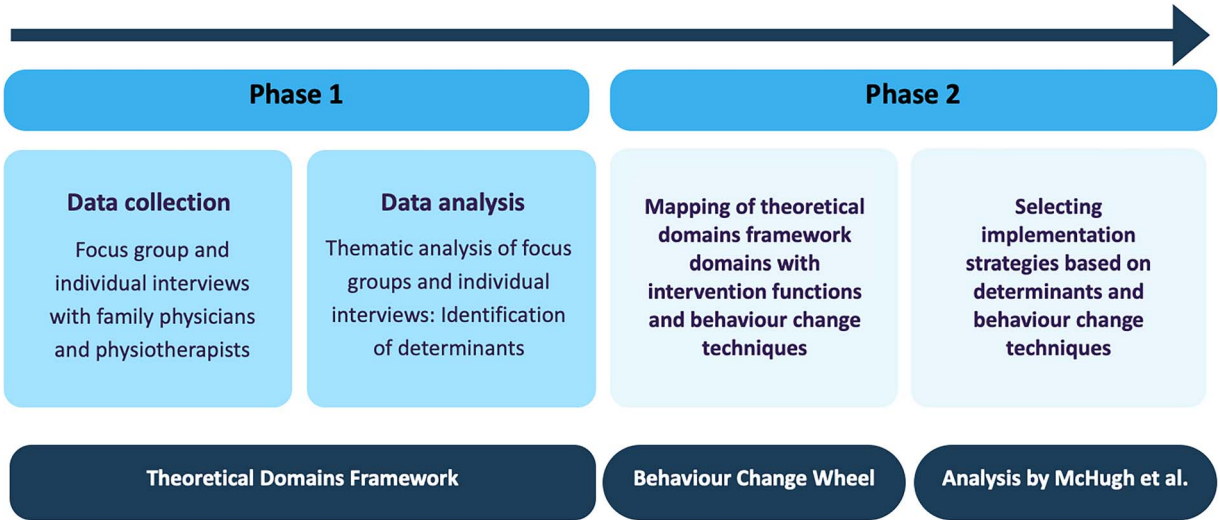

Figure 1. Steps of Data Collection and Analysis.

Table 2. Sociodemographic and Practice-Related Characteristics of Participants

Participant Characteristic	Family Physicians (n = 16) n (%)	Physical Therapists (n = 19) n (%)
Gender		
Woman	7 (44)	8 (42)
Man	9 (56)	11 (58)
Clinical experience (y)		
0–5	7 (44)	7 (37)
6–10	2 (13)	6 (32)
>10	7 (44)	6 (32)
Primary workplace		
Family medicine group	15 (94)	3 (16)
Private clinic	1 (6.2)	15 (79)
Emergency department	0 (0)	1 (5.3)
Primary sector of practice		
Public	15 (94)	4 (21)
Private	1 (6.2)	15 (79)
Location of practice setting		
Urban	10 (63)	17 (89)
Rural	6 (38)	2 (11)
Proportion of clinical practice dedicated to patients with musculoskeletal disorders		
0%–19%	6 (38)	0 (0)
20%–39%	10 (63)	0 (0)
40%–59%	0 (0)	0 (0)
60%–79%	0 (0)	2 (11)
80%–100%	0 (0)	17 (89)

Lack of Knowledge Regarding CPGs

Most family physicians were not aware of shoulder pain management CPGs. Both family physicians and physical therapists relied on resources other than CPGs for information related to shoulder pain management, such as academic books, websites, mobile applications, colleagues and summaries of peer-reviewed articles.

A few participants were not aware of some of the recommendations that were presented. Most family physicians from our study reported recommending an X-ray for all shoulder pain, although this modality is initially not recommended in the initial management of non-traumatic shoulder pain.[40,53] Some participants expressed uncertainty about specific recommendations, such as indications for advanced diagnostic imaging and referral for a surgical opinion for a suspected acute full-thickness rotator cuff tear or a glenohumeral dislocation.[40,53–55]

Lack of Assessment Skills and Importance of Communication Skills

Participants noted that often colleagues lacked the necessary assessment skills, which hindered effective patient evaluation and diagnosis. Most family physicians and physical therapists mentioned performing a clinical assessment including subjective and objective examinations. However, they mentioned that several family physicians do not adequately evaluate patients or skip physical assessment, leading to overreliance on diagnostic imaging for diagnosis.

The ability to effectively communicate with patients, especially in situations where patients' expectations did not align with evidence-based care (eg, patients' requests for non-recommended investigations or treatments) was viewed as a facilitator. Participants mentioned using their communication skills to discuss with patients about the recommendations, their beliefs and their expectations.

Opportunity

Regarding the opportunity to apply recommendations, 6 determinants were identified as factors related to environmental context and resources and 2 determinants were related to the social influence domain.

Limited Time, Training, and Access to Care

Limited duration of patient encounters posed a significant challenge in evaluating and educating patients, especially when patients present with multiple conditions or associated psychosocial issues. In such situations, family physicians might resort to prescribing more investigations or corticosteroid injections as initial treatment due to time constraints or limited timely follow-up appointments. Limited non-clinical time was also reported as a challenge by family physicians and physical therapists in searching for reliable shoulder pain management recommendations.

Healthcare access emerged as a substantial barrier to implementing CPGs for shoulder pain management. Family physicians reported that lack of access to publicly funded physical therapy was a significant obstacle for patients. Physical therapists also noted that patients' lack of access to a family physician impedes them from recommending diagnostic imaging promptly when warranted. However, the fact that most participants acknowledged that physical therapists have the expertise to manage shoulder pain independently and that they could be first-contact practitioners for most patients with shoulder pain could improve access to rehabilitation.

The last determinant related to environmental context was that many family physicians reported limited training for musculoskeletal disorders management throughout their family medicine program and residency.

Influence of Patients and Interprofessional Collaboration

Patients' expectations may hinder the use of shoulder pain recommendations. For example, family physicians have mentioned that they sometimes refer patients for an X-ray, despite this investigation not being recommended, to "buy peace." Similarly, when patients expected an unrecommended treatment (eg, electrotherapy), physical therapists reported that they may have used such modalities to avoid affecting their therapeutic alliance with the patient.

Collaboration between family physicians and physical therapists was viewed as a facilitator for implementing shoulder pain recommendations from CPGs. Family physicians recognized the need for physical therapists' involvement in recommending active rehabilitation, as it fell outside their scope of practice.

Motivation

Regarding motivation-related determinants for using recommendations from shoulder pain CPGs, 1 determinant was associated with beliefs about capabilities, 3 with beliefs about consequences, and 1 was a barrier related to the intention TDF domain.

Different Levels of Confidence and Expertise in Shoulder Pain Management

Most physical therapists and family physicians were confident when managing patients with shoulder pain, despite acknowledging the lack of time and resources that can be offered to them. However, some family physicians acknowledged that most of their colleagues were uncomfortable managing patients with musculoskeletal disorders, causing them to recommend more investigations.

Pros and Cons of Using the Recommendations From Shoulder Pain CPGs

Using CPGs was seen as an opportunity to optimize the use of health care resources. However, concerns were raised about potential limitations, such as the risk of an oversimplification of the patient's condition and the possibility of missing a serious condition or red flag, if present, if an X-ray is not prescribed for shoulder pain.

Limited Interest and Motivation in Searching for Scientific Evidence

Limited interest and motivation in searching for scientific evidence on shoulder pain management and taking part in musculoskeletal training were reported as a barrier. Some family physicians perceived that their colleagues were not motivated to change their musculoskeletal care practice. Some participants perceived that their current practice is already aligned with evidence-based care and that awareness of additional shoulder pain recommendations would significantly impact their clinical approach.

Phase 2: Selection of Implementation Strategies

Using the BCW, we identified 6 intervention functions (education, training, enablement, environmental restructuring, persuasion, incentivization) and 12 BCT (Table 1).[36,46,49] We then selected 11 implementation strategies from the ERIC compilation that are described in the next section, in Table 1 and Figure 2.[51] Some strategies addressed different TDF domains.

Strategies to Improve Capability

To enhance the knowledge and skills of primary care clinicians, we selected implementation strategies centered on the education and training intervention functions.

We recommend the development and email distribution of electronic educational material to family physicians and physical therapists. These materials would include summaries of recommendations from high-quality shoulder CPGs and information about the health and social consequences of applying the recommendations. The email sent to clinicians would also include links to other resources developed by our team, such as a website, a mobile application or social media accounts for updates on CPGs recommendations. Other educational resources, such as podcasts with insights on shoulder management recorded by expert clinicians could be developed.

Interactive educational outreach visits facilitated by experts in shoulder pain management could be organized within clinics, to present recommendations and provide information on the health and social consequences of applying the recommendations interactively. Meetings would include an interactive workshop addressing clinical examination skills with clinical patients and hands-on practice. To enhance interpersonal

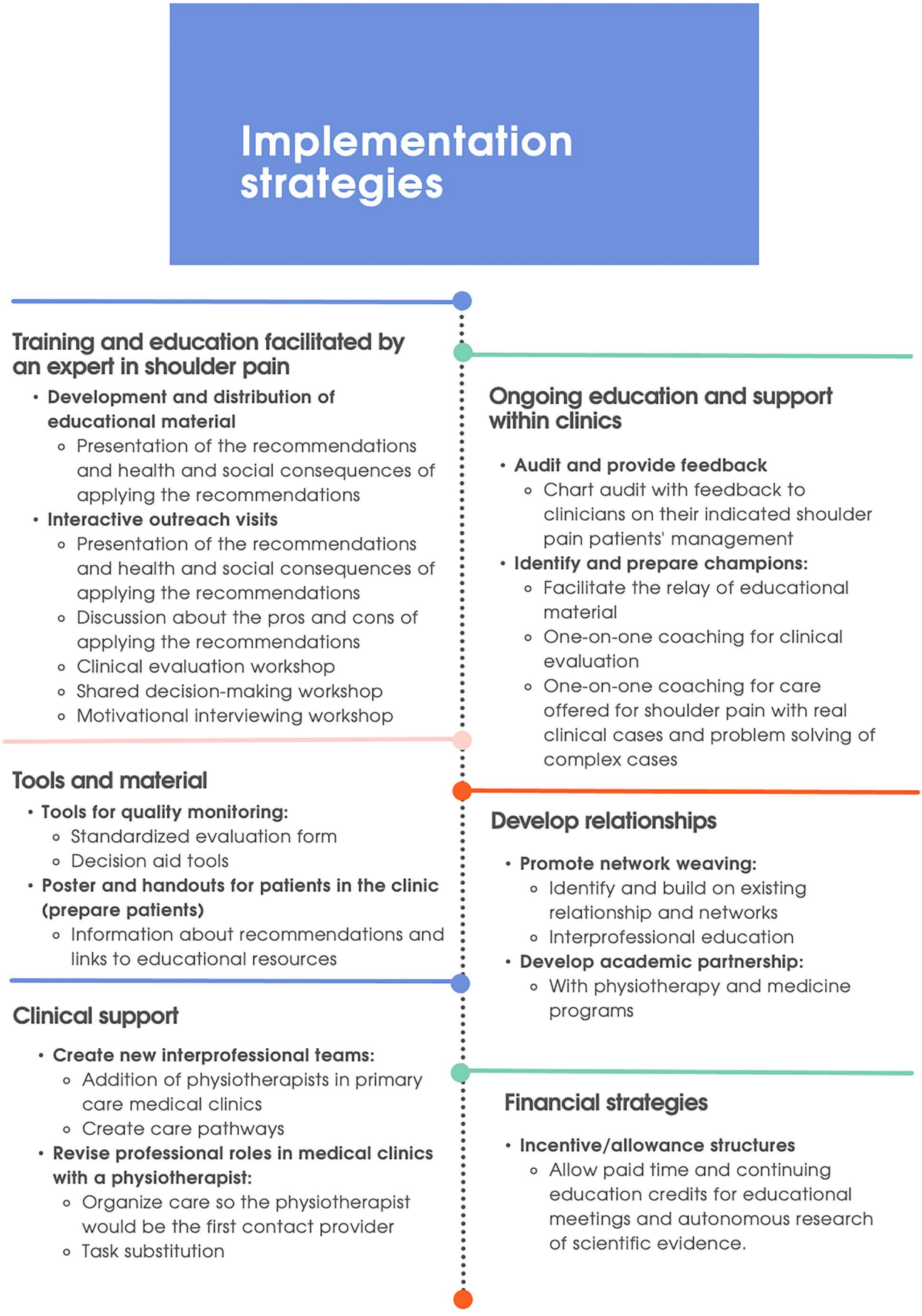

Figure 2. Summary of the Implementation Strategies.

and communication skills necessary for addressing patients' expectations and beliefs that are not aligned with shoulder pain CPGs, using shared decision-making. Role-playing exercises could enable clinicians to practice shared decision-making techniques. Additionally, motivational interviewing techniques could be included to help clinicians increase patient motivation for active rehabilitation.

Another potential educational method is audit and feedback, which involves a chart audit using indicators to evaluate clinicians' adherence to shoulder CPGs recommendations. Feedback would be provided to help clinicians identify areas for behavior modification, thus improving adherence to guidelines.

Strategies to Improve Opportunity

Enablement and environmental restructuring are the intervention functions underlying the development of strategies to address the determinants related to the environmental context and resources and social influence TDF domains.

To address time constraints faced by family physicians, we propose developing a standardized evaluation form to guide the subjective and objective patients' examination and decision aid tools. These quality monitoring tools could be integrated into the electronic medical charts for easier access.

To facilitate patient education on shoulder diagnosis, prognosis, and pain management, we propose creating patient-oriented information handouts and posters for waiting rooms. These materials would provide information on recommendations and links to educational resources, such as websites, podcasts and social media accounts to follow.

To assist clinicians in managing complex shoulder pain within a limited time, we recommend identifying clinical champions who are experts in shoulder pain management within clinics to facilitate the distribution of educational material and to provide one-on-one coaching for clinical assessment and problem-solving of complex shoulder pain. Clinical champions are individuals driven by an intrinsic motivation to enact change and dedicate themselves to supporting and advocating for implementation initiatives in their clinical setting.[56] One-on-one meetings with clinical champions could also address the barrier related to beliefs about capability. Clinical champions could facilitate the enhancement of clinicians' assessment and clinical reasoning skills aiming to provide superior care to patients living with shoulder pain.

To improve patients' access to rehabilitation, we suggest creating interprofessional clinical teams including physical therapists as musculoskeletal experts. These teams would enable family physicians to refer patients for rehabilitation, enhancing the continuum of care.

Since participants have identified that physical therapists could be first-contact providers for shoulder pain management, care could be reorganized to allow the physical therapist to be the first-contact provider for shoulder pain in medical clinics that include a physical therapist. This role would involve evaluating and managing patients and collaborating with family physicians when necessary. Some tasks performed by family physicians, such as providing training to family medicine residents for musculoskeletal disorders management, could be shared with physical therapists.

Promoting interprofessional collaboration among family physicians, physical therapists and colleagues with specialized skills in shoulder pain management can facilitate guideline implementation. We recommend facilitating referrals between providers by creating care pathways and promoting network weaving (community of practice) by building on existing relationships within and outside primary care clinics for information sharing and collaborative problem-solving.

Regarding clinicians' entry to practice training, we propose establishing ongoing partnerships with academic institutions. This collaboration would allow the integration of the recommendations from shoulder CPGs in the curricula, internship and residency of physical therapy and family medicine university programs.

Strategies to Improve Motivation

Education, enablement, persuasion and incentivization are mechanisms underlying the implementation strategies for addressing motivation-related determinants.

Participants hold different beliefs about consequences and intentions of using recommendations from shoulder CPGs. During interactive educational outreach visits, participants would also be encouraged to discuss the pros and cons of using evidence-based recommendations. For example, clinicians could be asked to discuss the implications of referring a patient with a rotator cuff tendinopathy for a diagnostic imaging despite this practice not being recommended.[40] Some participants have perceived that using recommendations from shoulder pain CPGs could limit their clinical reasoning. They would have the opportunity to discuss and clarify that CPGs should be used to assist clinicians in their decision-making, not to replace clinical reasoning.[57]

To address family physicians' limited interest and motivation in searching recommendations from shoulder CPGs and participating in musculoskeletal continuing education. We could explore options like offering continuing education credits or paid time for educational meetings and autonomous evidence-based training as incentives.

DISCUSSION

We have identified several determinants that may impact the implementation of clinical recommendations for shoulder pain management within 7 TDF domains: knowledge, skills, beliefs about capabilities, beliefs about consequences, intentions, environmental context and resources, and social influence. TDF domains were linked to intervention functions and BCT for selecting 11 implementation strategies to develop a multicomponent intervention to improve shoulder pain management in primary care.

The lack of awareness of shoulder pain CPGs and difficulties with clinical examination were identified as barriers. These barriers were also frequently reported as an obstacle to implementing shoulder and low back pain recommendations in other previous studies.[5,58] The lack of family physicians' skills for clinical evaluation may be explained by insufficient training in the management of musculoskeletal disorders and the fact that they have to be knowledgeable and manage multiple other health care conditions.[59,60] Most family physicians from our study reported lacking adequate training for managing patients living with shoulder pain.

To address knowledge and skills gaps, distributing educational material and conducting interactive outreach visits are frequently used and feasible strategies.[32,61] The education and training will also be provided in an interactive way to engage clinicians.[62] These strategies have yielded positive results in improving guidelines uptake as well as the

diagnosis and management of various disorders, particularly when these strategies are part of a multicomponent intervention for physical therapists and family physicians.[32,63,64] The audit and provide feedback strategy is another educational strategy for addressing clinicians' knowledge.[28] In a randomized controlled trial involving family physicians overprescribing diagnostic imaging for musculoskeletal disorders, there was a statistically significant but small mean reduction of 2.66% in the overall rate of imaging requests in the audit and feedback group compared to the control group.[65] We could, however, expect a greater change in guideline adherent care if the audit and feedback strategy is used in a multicomponent intervention.[66]

Regarding determinants related to beliefs about consequences, some family physicians and physical therapists in our study perceived that following shoulder pain management recommendations might replace clinical reasoning. In other studies exploring determinants of using CPGs in various clinical practices, participants also mentioned that recommendations from CPGs are often incomplete, superficial and lack applicability to the patient.[67,68] It is a common concern that using evidence from systematic research, such as recommendations from CPGs may not be generalizable to all patients.[69] However, recommendations from CPGs are not developed with the intention of replacing clinical reasoning.[69,70] In evidence-based practice, the starting point for clinical reasoning may begin with recommendations from CPGs that summarize evidence but should also include the health care professional clinical expertise as well as the patient's values and preferences.[69,71] Moreover, the fear of missing a serious condition or red flag and imaging over prescription, was a behavior linked to non-concordant evidence-based care in our study and in another recent survey.[72]

In addition to providing information about the health and social consequences of following recommendations in educational outreach visits, encouraging clinicians to reflect on the pros and cons of using the recommendations could help address these beliefs. For example, they could discuss that serious shoulder conditions (eg, neoplasm) are rare and that diagnostic imaging tests can be prescribed at a later stage if the patient's condition is not improving.[73,74] It is of paramount importance that clinicians understand the important role of recommendations from CPGs in clinical reasoning.[69]

Motivation plays a crucial role in implementing CPGs. In our study, some participants lacked motivation to seek out recommendations from CPGs, because they did not perceive that it would impact their practice. The same barrier was reported in another qualitative study covering determinants of using evidence-based practice in shoulder pain management.[68]

Using financial incentives to take part in professional development by allowing continuing education credits and paid time for educational meetings and research of scientific evidence. To our knowledge, the effectiveness of this type of strategy was not studied in the implementation of CPGs for musculoskeletal or more general primary care management, probably because this strategy requires changes at higher organization levels and cannot be easily implemented.[61,75]

Time constraints for patient care and research for recommendations were reported in our study and in other studies exploring determinants of evidence-based shoulder and low back pain management.[58,76,77] Managing chronic conditions requires more time than primary care clinicians usually have.[78] In addition to educational materials provided to clinicians, tools such as standardized evaluation forms and decision aids tools could be developed to facilitate and streamline the management of shoulder pain. A previous study included an electronic decision aid tool developed in consultation with stakeholders to promote requests for diagnostic ultrasound instead of magnetic resonance imaging in shoulder pain management.[5] The percentage of imaging requests considered appropriate increased significantly, from 31% before the intervention to 67% after, based on the review of 569 referrals by a cohort of clinicians mostly in primary care.[5]

Moreover, the use of clinical champions within clinics is a frequently reported implementation strategy.[79] In our project, the champions could facilitate the relay of educational material and be a resource for problem-solving, particularly in complex shoulder pain. This would address the lack of time to see patients and to search for recommendations as well as address clinicians' lack of confidence. A multicomponent intervention including clinical champions to improve adherence to clinical guidelines for low back pain yielded significant positive results.[80]

Patients' expectations were frequently mentioned in our study as a reason to refer patients for a diagnostic imaging even in cases that do not require an investigation.[40,53,81] Results of a recent survey study indicated that patients' expectations are among the 2 most common reasons reported by physicians to inadequately prescribe diagnostic imaging in low back pain care, along with clinicians worrying about missing a serious condition, if present, if the patient is not referred for imaging.[72] Patient-oriented handouts with information on recommendations and educational resources to be available in the waiting rooms of primary care clinics or distributed by primary care clinicians could be developed. This can help prepare patients to have a more active role in their care.[51] In 3 out of 5 multicomponent implementation studies using patient-oriented education for implementing Choosing Wisely recommendations, patient education reduced the use of unnecessary investigations or treatments in various clinical settings.[32]

Timely access to medical and rehabilitation care for musculoskeletal conditions is a major challenge.[82] Indeed, family physicians often want to recommend physical therapy for shoulder pain, but patients do not have easy access to these resources in the Canadian health care system.[83,84] Several participants from our study mentioned that physical therapists should be first-contact providers for patients with shoulder pain and interprofessional collaboration between family physicians and physical therapists was indicated as a facilitator to using recommendations from shoulder pain CPGs. Positive views regarding interprofessional collaboration and the potential sharing of extended-scope clinical roles is an opportunity to reflect on enhancing models of primary care involving collaboration between physical therapists and family physicians.[85]

Thus, we proposed the creation of new interprofessional clinical teams with family physicians and physical therapists as well as the revision of professional roles. Since barriers related to physical therapy access and interprofessional collaboration were very common, these strategies have the potential to be efficient in implementing better shoulder pain management.[86] However, these strategies require changes at

the organizational level and may not be feasible in the actual context without important administrative procedures.[87] Thus, promoting the development of networks and referral pathways between physical therapy and medical clinics may be more feasible since it does not require a large organizational change. Networks in the form of a community of practice were shown to increase the confidence of clinicians caring for patients with shoulder pain.[76]

Implications for Research and Practice

Understanding the determinants influencing the adoption of shoulder pain recommendations from CPGs is essential for effective behavior change among clinicians.[29] Our approach allowed us to develop a multicomponent intervention for implementing CPGs shoulder pain recommendations that is likely to be more efficient when put into practice. Implementing all strategies identified in our study may not be feasible in all clinical settings. In the literature, it remains unclear which implementation strategies are superior for the successful implementation of CPGs. For example, educational materials, educational outreach visits, and audit and feedback have yielded similar effect sizes for improving care in several implementation studies.[86,88] The successful implementation of selected interventions may be more dependent on whether or not they address specific determinants specific to the settings where the intervention is taking place.[86] In future steps of this project, our research team will consult stakeholders to prioritize determinants and operationalize and adapt strategies to create a tailored intervention that is better aligned with the clinical context and setting. A forthcoming study will assess the effectiveness of this multicomponent intervention in potentially changing primary care clinicians' behaviors related to using recommendations from shoulder pain CPGs. The successful deployment of this multicomponent implementation intervention has the potential to optimize health care resources' utilization and clinical practice to improve patients' outcomes.

Strengths and Limitations

To our knowledge, this is the first study that used the TDF and BCW to develop a comprehensive multicomponent intervention for implementing shoulder pain CPGs recommendations. The method used in this paper can be replicated to promote the use of other CPG recommendations for other musculoskeletal disorders. Regarding the transferability of the results, we made sure to include different health care professionals (physical therapists and family physicians), different genders (self-reported as "man" or "woman"), and various levels of experience and clinical practice.[44,45] We were also able to triangulate our results by comparing them to findings from previous studies to ensure confirmability.[44,45] However, our study has some limitations. Participants were aware that the interviewer was a physical therapist, which may have influenced their responses. However, the identified determinants are often very consistent with other studies covering determinants related to the implementation of CPG on musculoskeletal disorders. Also, participants may have had a particular interest in shoulder pain management, meaning their perceptions may not represent the views of other clinicians. However, participants were able to also identify several barriers to implementing shoulder pain management recommendations that they observed in colleagues.

CONCLUSION

We have identified individual determinants and organizational factors that can hinder or enhance the use of shoulder pain recommendations. Several implementation strategies that can improve shoulder pain management despite barriers identified were identified. Educational components within the intervention can address different determinants including knowledge and skills. Using decision aid tools and standardized evaluation forms, while being supported by clinical champions can help clinicians adequately offer care to patients with shoulder pain despite their busy practice. Developing educational resources for patients can also help address their expectations. Moreover, enhancing collaboration between providers by favoring defined care pathways and promoting networking may facilitate management despite the lack of health care access. However, improving collaboration may require organizational changes such as developing interprofessional clinical teams and revising professional roles. The specific intervention components should align with the readiness of care settings to embrace these organizational changes.

CRediT – CONTRIBUTOR ROLES

Veronique Lowry (Conceptualization [lead], Formal analysis [lead], Funding acquisition [lead], Investigation [lead], Methodology [lead], Project administration [lead], Writing—original draft [lead], Writing—review & editing [lead]), Francois Desmeules (Conceptualization [supporting], Funding acquisition [Equal], Methodology [supporting], Project administration [supporting], Writing—original draft [supporting], Writing—review & editing [supporting]), Patrick Lavigne (Funding acquisition [supporting], Writing—review & editing [supporting]), Simon Décary (Funding acquisition [lead], Writing—review & editing [supporting]), Yannick Tousignant Laflamme (Funding acquisition [lead], Writing—review & editing [supporting]), Marylie Martel (Formal analysis [supporting], Writing—review & editing [supporting]), Jean-Sébastien Roy (Funding acquisition [supporting], Writing—review & editing [supporting]), Kadija Perreault (Funding acquisition [supporting], Writing—review & editing [supporting]), Marie-Claude Lefèbvre (Funding acquisition [supporting], Writing—review & editing [supporting]), Kelley Kilpatrick (Writing—review & editing [supporting]), Anne Hudon (Conceptualization [supporting], Writing—review & editing [supporting]), Diana Zidarov (Conceptualization [supporting], Formal analysis [supporting], Funding acquisition [supporting], Writing—review & editing [supporting]).

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ETHICS APPROVAL

We received approval from the CIUSSS-de-l'Est-de-l'Île de Montréal (2021–2224) Health Research Ethics Committee in Montreal, Canada.

DISCLOSURES AND PRESENTATIONS

The authors completed the ICMJE Form for Disclosure of Potential Conflicts of Interest and reported no conflicts of interest.

This paper is based in part on a dissertation by V.L. that had been posted on Universite de Montreal Papyrus Institutional Repository. (https://papyrus.bib.umontreal.ca/xmlui/handle/1866/28696).

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DATA AVAILABILITY

The datasets used and/or analyzed during the current study are available from the corresponding author on a reasonable request.

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