

# Perceived Barriers and Facilitators to Using Knowledge Brokers in Canadian Rehabilitation Settings: A Qualitative Study

**Dina Gaid**

McGill University Faculty of Medicine <https://orcid.org/0000-0003-3419-941X>

**Sara Ahmed**

McGill University Faculty of Medicine

**Aliki Thomas**

McGill University Faculty of Medicine

**André Bussières** (✉ [andre.bussieres@mcgill.ca](mailto:andre.bussieres@mcgill.ca))

School of Physical and Occupational Therapy, McGill University Address: 3654 Prom Sir-William-Osler, Montreal, QC Canada H3G 1Y5

---

## Research

**Keywords:** Knowledge translation, Knowledge brokers, Rehabilitation, CFIR, Semi-structured telephone interviews

**Posted Date:** September 9th, 2020

**DOI:** <https://doi.org/10.21203/rs.3.rs-72817/v1>

**License:**  This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

---

# Abstract

**Background:** Knowledge translation experts advocate for employing knowledge brokers (KBs) to promote the uptake of research evidence in health care settings. However, little is known about factors influencing the utilization of KBs, thereby limiting their employment within healthcare organizations. This research aimed to identify factors likely to hinder or promote the optimal use of KBs within rehabilitation settings in Canada.

**Methods:** Qualitative study using semi-structured telephone interviews with individuals performing KB activities in rehabilitation settings across Canada. The interview topic guide was informed by the Consolidated Framework for Implementation Research (CFIR) and consisted of 20 questions covering five domains (characteristics of individuals, inner setting, process, outer settings, and innovation characteristics). All interviews lasted 60 to 90 minutes, were digitally recorded, and transcribed verbatim. We conducted qualitative descriptive analysis combining deductive coding guided by the CFIR. Two independent analysts coded and rated all interviews, then met to review, deliberate and modify the codes as appropriate. A matrix was created by listing the salient codes for each CFIR construct to identify factors (facilitators and barriers) at the individual, organisational, and process level most likely to impact the KB's success/failure.

**Results:** Twenty-three participants, from five Canadian provinces were interviewed. At the individual level, the majority of participants reported having strong communication skills, being confident about performing KBs activities, and possessing solid clinical experience and prior research skills. At the organizational level, most respondents indicated constantly networking and engaging with clinical teams and different stakeholders, and having an acceptable level of guidance from their managers. Very few participants felt that they received sufficient organizational support (i.e., clerical support and IT support). At the process level, all participants indicated needing evaluation tools to better gauge their performance, and the majority mentioned that they would benefit from having additional training tailored to their roles as KBs.

**Conclusions:** Individual, organisational and process level factors likely to hinder or promote the optimal use of KBs within Canadian rehabilitation settings include skillsets and networking abilities; culture, resources, and leadership support; and the need for specific training for KBs and for evaluation tools to monitor their performance.

## Contributions To The Literature

- Knowledge brokers in the field of rehabilitation need to possess a number of unique features including communication skills, and research skills, clinical experience and networking and engagement abilities.
- Organizations should provide knowledge brokers with access to physical resources and open access databases, and allow adequate time and financial support for knowledge brokers roles.

- Knowledge brokers need specialized training in brokering activities and to evaluate their own performance.

## Background

Clinical practice often fails to be optimally informed by research evidence [1]. For example, despite available clinical guidelines to inform practice in rehabilitation [2–8], there are persistent gaps between knowledge generation and its use in practice [9–18]. Such gaps have a negative impact on the health outcomes of individuals and communities [19] and can lead to inefficient use of limited health care resources [1, 12]. There is a growing interest in the concept of knowledge translation (KT) as a means to promote the use of research evidence into clinical practices [20].

The use of knowledge brokers (KBs) is considered as one of the promising KT strategies, [11, 21, 22] that can enhance success and sustainability of the whole KT process [23], and consequently help reduce research-practice gaps [11, 17, 24–30]. Evidence from multiple studies suggests that KBs have an impact on behaviour change [31] in many healthcare sectors [32–39], including rehabilitation [40–47]. For instance, Baskerville et al. showed that primary care practitioners who work with knowledge brokers are 2.76 (95% CI, 2.18–3.43) times more likely to adopt evidence-based guidelines [48]. According to The Canadian Health Services Research Foundation (CHSRF), KBs are defined as “one of the human forces which bring people together to build relationships, uncover needs, share ideas and evidence aiming to improve job productivity” [24]. KBs act as intermediaries between researchers who produce scientific knowledge, and clinicians and other knowledge users (decision-makers and caregivers) who apply this knowledge [11, 49–52]. They link practitioners with researchers, facilitate their interactions to better understand goals, cultures, and environmental limitations of each other’s work, and allow practitioners and researchers to work collaboratively to ease evidence uptake [10, 53–55]. Glegg et al. [56] developed the Role Model for Knowledge Brokering which classifies KBs activities into five main domains: 1) information manager, 2) linking agent, 3) capacity builder, 4) facilitator, and lastly 5) evaluator. (Additional file 1 presents each role, with definitions and examples of related tasks)

One of the underlying features of a KB is being an insider. Several studies have indicated that KBs are clinicians who are typically embedded in their organization and are performing the additional role of broker in order to influence peers [21, 57–59]. However, a recent study provided new insights on the challenges and tensions experienced by KBs that can impact the effectiveness of the brokering process [60]. For example, the tensions between different aspects of brokering (i.e. collecting information, sharing information, and adopting information) and those resulting from being positioned between individuals with different perspectives (i.e., between clinicians and researchers). In Canada and elsewhere the interest in the utilization of KBs as a promising strategy is growing, knowledge on how the brokering role is mediated by different facilitators and barriers is limited [40–47, 61]. To date, no previous research has identified potential barriers associated with using KBs as a means to promote the uptake of research evidence in rehabilitation settings. In the absence of such knowledge, the ability of rehabilitation

organizations to utilize KBs within rehabilitation settings remains limited [11, 62]. This research aimed to identify the factors likely to promote or hinder the optimal use of KBs within rehabilitation settings.

## **Methods**

### **Research Design**

The study consisted of a qualitative descriptive design [63]. Semi-structured telephone interviews were conducted with individuals who perform brokering activities in rehabilitation settings across Canada. The Checklist for qualitative studies: Standards for Reporting Qualitative Research (SRQR) is available in Additional file 2.

### **Participants and setting**

KBs who promote the uptake of research evidence in clinical practice for rehabilitation practitioners, were invited to participate in the study, regardless of whether they worked in clinical, educational or research institutions, across Canada.

### **Eligibility Criteria**

Eligible participants who had already participated in a related study [59] (n = 100) were invited to participate in this current study. They received an invitation email including an information sheet describing the study context and objectives. Adopting a convenient sample approach, we planned to interview all interested participants. Participants were asked to follow a hyperlink attached to the invitation email to complete a consent form and to provide their availability for an interview using Microsoft Webform. A reminder was sent by e-mail every 2 weeks for 6 weeks. The recruitment process ended 2 weeks after the last reminder (i.e. at 8 weeks).

### **Recruitment strategies**

Eligible participants who had already participated in a related study [59] (n = 100) were invited to participate in this current study. They received an invitation email including an information sheet describing the study context and objectives. Adopting a convenient sample approach, we planned to interview all interested participants. Participants were asked to follow a hyperlink attached to the invitation email to complete a consent form and to provide their availability for an interview using Microsoft Webform. A reminder was sent by e-mail every 2 weeks for 6 weeks. The recruitment process ended 2 weeks after the last reminder (i.e. at 8 weeks).

### **Instrument**

The interview topic guide was informed by the Consolidated Framework for Implementation Research (CFIR), which provides a pragmatic structure for determining potential factors related to the implementation process [64]. In our case, the CFIR was useful to guide various questions that cover all domains related to the KBs roles and work environment. The CFIR is composed of five major domains:

characteristics of individuals, inner setting, process, outer settings, and innovation characteristics. The interview guide consisted of 20 questions covering the five CFIR domains (see Additional file 3).

The interview topic guide was developed jointly by the first author (DG) and three KT experts (AB, SA, AT) familiar with the CFIR. The interview guide was translated into French and revised for content and face validity by three English- and three French-speaking KBs working in the rehabilitation field, and revisions were made accordingly. The two interview guides (English and French) were pre-tested with the first six recruited KBs (three English and three French-speaking KBs) before starting the data collection. Minor changes were made based on the feedback to generate the final version.

## **Procedures**

Semi-structured individual interviews were conducted between February and May 2019. The first author conducted all English-language interviews, while another investigator (DZ) led the French-language interviews. A 2-hour training session with both interviewers was designed to discuss the content of the interview guide and the structure of the interviews. Interviewers had no prior relationships with any of the participants. Informed consent was obtained before each interview. All interviews lasted between 60 to 90 minutes, were digitally recorded using the Zoom meeting platform [65], and transcribed verbatim.

## **Analysis**

Our qualitative descriptive analysis [66] consisted of deductive coding guided by the Consolidated Framework for Implementation Research (CFIR) [64, 67] and then inductive coding to identify subthemes within CFIR domains. The process involved three steps:

## **Data coding**

Two team members independently coded and analyzed each interview [68, 69] using a Microsoft Excel sheet to facilitate data organization, management, and coding. In order to maximize the rigour of the coding process, the study team had several meetings to discuss and review the coding scheme. The two coders compared their coding on a first transcript, resolved discrepancies, and reached consensus through discussion. The coding scheme sheet was further tested with four additional interviews. Minor modifications were made by adding pre-specified sub-codes to four questions to facilitate coding. Coders then met periodically to compare and adjudicate coding differences and achieve consensus. Three experts in qualitative research (AB, SA, AT) provided a critique of the analysis and interrogated the coding to ensure a robust and defensible coding of the data. Lastly, the coders met to review, deliberate and modify the codes as appropriate.

## **Code rating**

As per CFIR rating rules, the rating process was used to help elucidate the relative importance of each construct across all interviews [70]. The rating was performed for two dimensions: valence and

magnitude. “Valence” refers to the construct’s influence (positive [+], negative [-], no impact [0]), valence was considered to be positive (facilitated KBs roles), negative (hindered KBs roles), or have no impact (not affecting KBs roles). “Magnitude” refers to the extent to which the constructs were discussed. Magnitude was determined based on the level of agreement among participants, which was reached by calculating the proportion of participants who mentioned each code (e.g., few = 0%- 25%, some = 26–50%, many = 51%- 75%, most = 76–100%). Only codes that were described by two or more participants were tabulated [71] and only codes that were rated with 25% or higher were included in the study results. Salient codes were those discussed by the majority of respondents (more than 50%) [72, 73]. Two raters independently rated the codes, then met and compared their rating until consensus on all ratings was achieved.

## **Generate matrix and identify key constructs:**

Finally, a matrix identifying the factors that appeared to positively (facilitators) or negatively (barriers) impact the KBs was created by listing the salient codes for each CFIR construct.

## **Results**

Of the 100 individuals invited to participate in the study, 23 KBs from five Canadian provinces (Quebec “QC”, Ontario “ON”, Alberta “AL”, British Columbia “BC”, Manitoba “MB”), agreed to be interviewed. Demographic characteristics of the participants are displayed in Table 1. Tables 2 and 3 present the salient facilitators and barriers, as per the CFIR themes. Figure 1 presents the salient barriers and facilitators, reported by more than 75% of participants. Additional files 3 and 4 present the descriptive analysis based on CFIR domains together with illustrative quotes.

### **Table 1 Demographic characteristics of the participants:**

Participants' characteristics	N (%)
Language	
· English	17 (74%)
· French	6 (26%)
Province	
· Quebec	10 (43%)
· Ontario	4 (17%)
· Alberta	3 (13%)
· British Columbia	3 (13%)
· Manitoba	3 (13%)
Age	
· ≤ 40 years old	12 (52%)
· 41-60 years old	10 (43%)
· > 60 years old	1 (4%)
Gender	
· Female	22 (96%)
· Male	1 (4%)
Profession	
· Clinician	11 (48%)
· Administrator	7 (30%)
· Manager	5 (22%)
Educational level	
· Bachelor's	4 (17%)
· Master	17 (74%)
· Doctoral	2 (9%)
Job-status	
· On a full-time basis (4-5 days per week)	9 (39%)
· On a part-time basis	14 (61%)

(1 -3 days)

**Tables 2 Salient facilitators according to themes based on the CFIR:**

CFIR constructs (Specific themes)	N (%)
<b>CHARACTERISTICS OF INDIVIDUALS</b>	
Self-efficacy to perform KBs roles	
· Feel confident	19 (83%)
Personal Attributes	
· Having communication and networking skills	21 (91%)
· Having clinical experience	17 (74%)
· Having graduate studies (i.e., Master degree)	17 (74%)
· Being interested and involved in research activities	15 (65%)
· Being motivated	12 (52%)
<b>INNER SETTING</b>	
Networks & Communications	
· Having a constant networking and engagement with teams and other stakeholders	21 (91%)
· Sharing relevant information	14 (61%)
Needs of Those Served in the organization	
· Awareness of needs via raised questions and concerns	21 (91%)
· Awareness of needs via informal engagement	21 (91%)
· Awareness of needs via attending periodical staff meetings	16 (70%)
Implementation Climate	
· Goals are responsive to needs (not pre-determined goals)	18 (78%)
Readiness for Implementation	
1. Leadership Engagement:	
· Providing guidance	15 (65%)
· Accessible and available manager	12 (52%)
2. Available Resources:	
· Having access to computers	23 (100)
· Having offices	13 (57%)
· Networking programs	12 (52%)
3. Access to Knowledge & Information:	

·	Networking with various stakeholders	18 (78%)
·	Subscription to journals and newsletters	17 (74%)
·	Having access to library (i.e. journal databases)	16 (70%)
·	Online searching	12 (52%)
OUTER SETTING		
Cosmopolitanism		
·	Connected to professional support groups (i.e., community of practices)	12 (52%)
INNOVATION CHARACTERISTICS		
Cost		
·	Feel stable in positions	16 (70%)

**Tables 3 Salient barriers according to themes based on the CFIR:**

CFIR constructs (Specific themes)	N (%)
<b>INNER SETTING</b>	
Networks & Communications	
Need more communication with stakeholders	15 (65%)
Implementation Climate	
No incentives or salary raise	22 (96%)
Lack of financial support	18 (78%)
Lack of time	18 (78%)
Not liberating time for KBs activities	14 (61%)
Lack of administrative support	14 (61%)
Not considered KBs activities as a priority	12 (52%)
Readiness for Implementation	
Need access to information (i.e., databases)	12 (52%)
<b>PROCESS</b>	
Planning	
Need training	20 (87%)
Not receiving KBs training	18 (78%)
Reflecting & Evaluating	
No evaluation for KBs performance	23 (100%)
Need to evaluate KBs performance	13 (57%)
<b>OUTER SETTING</b>	
Peer Pressure	
Need to contact other KBs (i.e., COP)	14 (61%)

## I. Characteristics of Individuals

A. Knowledge about KBs Roles: Many participants (70%) reported that their role was mainly to seek, adapt, and share evidence within their local context. More than half (57%) of the respondents indicated that linking different groups of stakeholders was a key role, whereas others (39%) stated that

implementing new practices by building individual capacities and addressing barriers for clinical practice change was an important aspect of their role.

*"It's helping people access the right evidence at the right time in the right amount to help them address their questions and or to have supporting evidence to move forward" (MB5)*

B. Self-efficacy: Most participants (83%) felt confident about their ability to perform their KBs roles, and one quarter of participants believed that they have the skills needed to perform KBs roles, which promoted their self-confidence.

*"I feel confident ... I am an occupational therapist ...for almost 14 years... I have a really good understanding of the clinical environment, the frontline care.... I've also spent almost 12 years being actively engaged in research activities ...so having my feet in both worlds I think gives me a lot more confidence" (AB7)*

C. Individual Identification with the Organization: About half of the participants' job evolved to include KBs roles over time (52%). In contrast, several other participants (39%) applied for a KB position.

*"I was not identified... I created the role for myself I think it became self-identified ...I was successful in being able to sort of advocate for the importance of having a role like this" (AB7)*

D. Personal Attributes:

1. Clinical Experience: 74% of interviewees stated that they had clinical experience and of those, 10 (43%) reported that an in-depth understanding of clinical topics helps them better address the needs of their peers while performing KBs roles.

*"A broker... somebody who is somewhat connected to the topic (clinical topic) right and understands the real-life context so that's one thing" (AB6)*

2. Research skills: Similarly, 74% of participants had formal research training (e.g., Master degree) or had taken part in research activities (65%).

*"My training as a master student is a facilitator because I've been exposed to research so looking for info in database is easier for me than it is for a clinician" (QC9)*

3. Communication Skills: Nearly all participants (91%) stated that good communications and networking skills were essential to perform their job.

*"I think that communication skills are probably one of my strengths" (QC12)*

4. Interpersonal attributes: Other attributes perceived as helpful to perform their KBs roles included being interested and motivated to implement the latest evidence and able to motivate others (52%), being

flexible (48%), having emotional intelligence (43%), leadership skills (39%), and being a life-long learner (26%).

*"I had already volunteered, I was always the first one to put my hand up to be involved in a new initiative or a new project or be the chair of a city, so they had had lots of opportunities to kind of see me in action" (ON1)*

## **II. Inner Setting**

A. Networks and Communications: Most participants (91%) had consistent networking and engagement with clinical teams and different stakeholder committees (e.g. clinical teams, professional groups and provincial groups). 61% regularly shared information of potential interest with team members (e.g., upcoming training or funding opportunities). Mostly, networking activities were performed remotely for almost all participants (91%) through email exchanges, phone calls and online meetings (Skype, Zoom, WebEx) especially if a participant was responsible for a large organization. In-person meetings were also very common (78%).

*"If there's a workshop coming up or a webinar that people might be interested in, a grant funding, call for research or for program development, then I would email that to everyone in our organization" (MB11)*

Almost two thirds of participants (65%) reported that they need more communication with their stakeholders, and one quarter of participants suggested using online platforms to improve communication.

*"One thing that would improve my ability to do the KB role it certainly is more and better networking. I still find that communication from kind of provincial groups getting that information to frontline is still a barrier" (AB17)*

B. Needs of Those Served in the Organization: Almost all participants (91%) were made aware of their stakeholders' needs by questions and concerns raised by their staff. Needs were also identified through informal engagement with peers (91%), during regular staff meetings (70%), by questioning the stakeholders (43%), through receiving stakeholders' feedback and complaints (30%), or through conducting needs assessments (30%).

*"I understand their needs based on our communications you know I hear from people every day I feel like I spend most of my day talking to people in different regards" (AB7)*

### **C. Implementation Climate**

1. Tension for Change: One quarter of participants (26%) reported a lack of awareness of KBs roles within their organization.

*"When it comes to clinicians or teams or other parts of the organization ... they will say, well you know, why should we do what they wants us to do... I keep trying to explain... I'm the messenger I'm the helper I'll*

*help you move forward” (ON1)*

2. Relative Priority: Twelve participants (52%) reported that performing KBs activities was not considered a high priority for the organizations.

*“I’m always having to kind of push myself on others when they’re like why are you bothering us with this kind of thing... others don’t see it as a priority and because the organisation has not made it a priority” (ON1)*

3. Organizational Incentives & Rewards: Though Almost all participants (96%) didn’t receive any incentive or a salary increase to perform KBs activities.

*“Nope no we don’t have any incentive program” (ON8)*

4. Goals and Feedback: KBs activities performed by interviewees had several goals such as supporting implementation of research evidence and keeping clinicians up-to-date (78%), and networking with different stakeholders and engaging clinicians (39%).

*“Me and my team supports them [clinicians] then with actual implementation with ongoing education as well as evaluation so we can come in and do audits we come in and do training we help them treat things” (AB6)*

For most participants (78%), the goals of KBs activities were not pre-determined, however, goals were responsive to local context needs for several.

*“I totally agree yeah it’s really based on the needs of them yeah what gets identified” (AB7)*

Almost 40% of participants (n = 9) reported the KBs roles were not well-defined.

*“I don’t know... I haven’t read a definition of knowledge brokering best book role” (MB5)*

And a similar number (35%) reported the feeling of being overwhelmed with numerous tasks.

*“I’m trying to do a lot with not just my time... I think that’s one of the challenges within my role is I’m expected to do all of those things... Mm-hmm it’s a lot of work” (ON1)*

5. Organizational support: One third of interviewees (35%) received administrative support such as graphic design and clerical help, IT support, and digital media, and adequate time to perform KBs activities. Eight interviewees had time to perform KBs activities, and the remaining seven had an information sharing system. However, most participants reported the lack of financial support (78%) (i.e., financial support to attend training opportunities), lack of time (78%) (i.e., not liberating KBs or clinicians to participate in activities), and lack of administrative support (61%) were barriers.

*“Limited budget that you have access to. ...You know the common phrases, we have no money” (MB4)*

## D. Readiness for Implementation

1. Leadership Engagement: Two-thirds of participants (65%) reported receiving guidance from their managers. Several also mentioned that managers are accessible (52%), supportive (48%), and open to discussion (39%).

*"My manager was great... Very supportive" (MB3)*

Six participants praised their managers for liberating them to attend training opportunities, believing in KBs activities, and allowing for more KBs autonomy. Some participants (30%) complained of the lack of managers' accessibility and availability.

*"I wish I had more access to her [my manager] sometimes she's a very busy woman" (AB7)*

2. Available Resources: All participants had access to computers, many had office space (57%) and access to software programs (Telemedicine Skype, Zoom, SharePoint, Adobe connect, OneNote) (52%), and or conference rooms (35%).

*"We have persuaded many teams to use zoom as a way to communicate so zoom has increased our capacity to reach out to certain clinicians even patients and physicians" (QC18)*

3. Access to Knowledge & Information: Most participants (78%) reported that networking with colleagues, experts, or other stakeholders (i.e., patients), and social media helped them gain information. Many also access different sources such as organizations newsletters (74%), the library databases (70%), and other online searching (52%).

*"We're also involved in various communities of practice which shares information latest research clinical practice guidelines" (BC2)*

Nonetheless, several expressed the need to access information resources (i.e., databases) (52%).

*"It's quite hard to access evidence-based because our library services is not great.... we don't have much access to data back databases" (QC18)*

## III. Process

A. Planning: Eighteen participants shared that they did not receive any training on their KBs roles before starting their job. Nearly half of the participants (43%) relied on self-learning activities and searched for educational training opportunities that could help them perform the KBs role. One third of participants (35%) mentioned that their organization provided ongoing training opportunities at work, and the remaining participants (30%) said they gained their KBs knowledge and skills over time with work experience. Few participants (26%) received formal KT training (Master degree or a certificate).

*“There was the opportunity to do this knowledge translation certificate at SickKids [hospital] ....I did the one through Guelph... that course in knowledge translation open my eyes” (ON19)*

Most participants (87%) expressed the need for additional training to improve their skills in communication, research, managing people and projects, as well as change and conflict management.

*“I think I could be more effective if I add more training... training for myself in terms of hopping my skills” (ON1)*

B. Engaging: Interviewees reported several factors likely to encourage their peers’ involvement in KT activities, including KBs’ credibility, building trust, and being seen as a source of information (48%); participants’ attitude toward teammates and mutual respect (39%); providing clear explanations and justifications when implementing new evidence, favouring shared decision-making (35%); being insiders, engaged within teams, and aware of the local context needs (35%); being interested in their peers (35%), and avoiding being seen as “giving orders” (35%).

*“Yes I would say... it has to do with my credibility authority and come relational interpreter relational competencies” (QC18)*

C. Reflecting & Evaluating: Nearly all participants monitored their performance through different strategies, including having ongoing follow-up with their managers (96%), presenting regular reports (83%), receiving feedback from their managers (48%), tracking productivity and meeting stakeholders’ needs (35%), and meeting goals and deadlines (30%).

*“There are reports, periodic performance reports, I think every six months” (ON8)*

Nonetheless, all participants expressed the lack of formal evaluation of their knowledge brokering performance (or an evaluation framework) and some participants (57%) agreed that a valid evaluation tool to gauge their performance would be useful

*“I feel like there must be a better way to measure. I'm just not sure what it is... momentum plan where we said like three months six months or one year type goals and it has anything to do with knowledge brokering” (ON16)*

#### **IV. Outer Setting**

A. Cosmopolitanism: Half of the participants (52%) were connected to professional support groups (community of practices “CoP”) or provincial committees (35%) which kept KBs up-to-date.

*“We have our community of practice and things like that that we discuss you know best practice and what is going on and what people are experiencing at their sites and work together as a team” (BC2)*

B. Peer Pressure (Peer Support)

Half of the participants (61%) reported a need for a CoP for individuals who perform KBs activities. Nearly half of participants (43%) stated that they sometime contacted other individuals who perform KBs activities, and one third of participants didn't contact any KBs at all.

*"It is really important to the people, the KB community of practice... that mentorship, having other knowledge brokers to talk to, like the librarian, and just having some of those structures that are in place and the support" (MB5)*

## V. Innovation Characteristics

A. Innovation Source: The majority of participants (78%) reported that their organizations believe in the importance of keeping clinicians up-to-date and to support them, to ensure the highest standard of care.

*"It definitely needed a knowledge broker position... because there are so there were so many players... I think having one central person that kind of coordinated all of that was pivotal so for me" (MB3)*

B. Relative Advantage: Perceived advantages of performing KBs activities included feelings of satisfaction and completion (35%), flexibility in terms of time and place (30%), and building professional relationships and credibility (26%).

*"That's my satisfaction, that's my incentive, that's that the reason I do the job I do, not financial" (QC12)*

C. Cost: Nineteen participants were paid through governmental funds or foundations, and over two thirds felt stable in their positions.

*"Well I work in a hospital in Ontario, it is publicly funded through the lens from the Ministry of Health" (ON1)*

## Discussion

This study aimed to identify factors likely to hinder or promote the optimal use of KBs within Canadian rehabilitation settings. Our findings showed that factors common to the five different Canadian provinces likely to influence KBs roles are mainly associated with three levels: individual, organizational, and process level.

### Individual level

Each broker in the present study was unique in terms of their personal attributes and the particular skills required for their position and their local context. Prior research has suggested exploring which of these attributes and skills are most likely to support and enhance KBs efforts in knowledge translation [74, 75]. Our findings address this gap by showing that having certain attributes and skillsets (i.e. clinical experiences, understanding of local context demands, communication and research skills, and involvement in research activities) was viewed as favourably impacting the performance of KBs.

Cultivating these features may help to ensure the success of the KT process. These findings are consistent with those from a realist review [58] and a national survey [59] undertaken by our team, showing that KBs are often clinicians embedded within the organization with over 15 years of clinical experience. Likewise, previous research reported that positive traits of KBs include professional competencies [76–78], experiential knowledge [76], and communication skills [79]. This emphasized that KBs success does not only lie in what they do, but also in who they are [80].

Our finding also indicated that personal attributes that are common traits of KBs included motivation and flexibility, having emotional intelligence and leadership skills, intellectual curiosity and analytic skills. This is also in line with previous research suggesting that KBs are enthusiastic, agreeable, friendly, flexible, positive, persuasive, entrepreneurial, proactive, comfortable working in a dynamic environment, and open-minded [81, 82]. Interestingly, our findings showed that many participants were self-motivated to get involved in brokering activities voluntarily; these findings are also consistent with another study [59], showing that many KBs volunteered to perform this role. For several participating KBs, and consistent with the scoping review by Bonawitz et al [81], the feeling of satisfaction was a sufficient motivator and reward for continuing to perform these types of activities, even in the absence of organizational incentives. A recent mixed-methods study also showed that ownership, persuasiveness, and grit may all contribute to the one's ability to drive the KT process [80].

Together, those skills and personal attributes appear to provide KBs with the required self-confidence and credibility among their teams, thereby reducing resistance to behavioural change. This is supported by prior research indicating that KBs tend to be trusted, accountable, respected individuals who have credibility among their teams [31, 75, 83]. These individuals appear to be influential among various stakeholder groups [84, 85] because of their positive attitude which facilitates the knowledge sharing process and drives behavior change within an organization. These identified skills and attributes need to be considered by employers and KT researchers when selecting individuals to play the KB roles within their organizations.

Another preferred feature of KBs was that of insider (i.e. working in the same setting as team members) as it appeared to facilitate networking and engagement in brokering activities and increase the KBs awareness of the local context needs and the desired change. Our findings are consistent with research indicating that brokering activities are highly responsive to the context in which they occur [75], and that KBs should work within the given clinical setting [21, 57] as this raises awareness of their peers' needs, schedules, clinical roles, caseloads, current practices, and past experiences [84–86]. Findings from this study showed that working in a different building or city was perceived as a barrier to constant involvement. Bonawitz et al. [80] have indicated that the physical presence at the point of change may contribute to an individual's ability to drive the desired change. Applying multiple facilitation methods (i.e., interactive discussion combined with online resources and multiple technology methods) [56, 85, 87, 88] was reasonable compensation for KBs working remotely to promote the success of the KBs roles. In general, our findings at the individual level can be used to select more effective KBs to enhance the KT process.

# Organizational level

Recognizing that knowledge brokering involves interactions between various types of stakeholders, it is important to consider the social determinants of brokering activities [74]. Our findings showed that networking and engagement with different stakeholders was seen as an essential element of the brokering activities since constant networking helped KBs to be aware of stakeholders' needs. Also, ongoing conversations among KBs and their peers seem to have a number of advantages at the inner setting level when communicating with clinical teams and managers (e.g., decreasing the resistance to change and providing the informal evaluation for KBs activities) and at the outer settings level when communicating with professional and provincial groups (e.g., facilitating the accessibility to information). The existing literature [89–93] and a recent mixed-method study [94] showed that by building relationships with knowledge users Canadian KBs' help their peers to gain access to research evidence that can inform or improve their practices. Previous research also emphasized the importance of interpersonal communication as a substantial element in knowledge brokering; communication acts as a foundation to build relationships of trust between KBs and their working teams [10, 54, 76, 90, 95]. Emphasising strong communication skills and networking abilities needs to be highlighted as essential elements in KBs' job requirement in the future.

Organizational support (access to resources, administrative, technical, and financial support) can positively influence the initiation and sustainability of the KBs role within an organization [31, 74, 81, 84–86, 96]. Indeed, our findings suggest that several forms of organizational support can impact the success of KBs roles. For instance, providing access to a library and databases and subscribing to relevant newsletters, providing IT support, clerical support, virtual communication tools, physical space “offices and conference rooms”), and allowing adequate time for KBs activities (i.e., liberating individuals to perform KBs activities and liberating clinicians to participate in KBs activities) were deemed important by participants.

Our findings also highlighted a lack of financial support for KBs activities (i.e., budget for developing KBs resources and attending conferences). Previous research has reported that dedicating financial support for brokering activities clearly facilitates these activities [84–86, 96, 97]. One solution might be to work in collaborations with researchers and graduate students, [59] taking advantage of funded research investigating brokering activities [97]. Prior research also emphasized that organizations should value and prioritise brokering activities as well as enhance the awareness of the KBs role to positively impact their function [97]. This was reflected in the views of our participants who raised issues related to the organizations' limited awareness of KBs, unclear or poorly defined KBs roles, a lack of prioritizing of brokering activities, absence of initial or ongoing training for KBs, and the need for a reward system for brokering activities.

Our findings highlight that the impact of knowledge brokering activities is a shared responsibility between KBs and their organizations, as devoting time, allowing facilities for communication, and dedicating financial support all seem to positively impact the KBs' roles.

## Brokering process

Our findings highlighted the lack of training for KBs, which has also been reported elsewhere [58, 59]. Despite this, KBs seem to be keenly aware of expected roles and targeted goals (e.g., supporting the implementation of research evidence, keeping clinicians up-to-date, and networking with different stakeholders), suggesting that KBs activities are highly responsive to the local context [75]. Previous research also indicated that cumulated experience for KBs may balance the lack of KBs-related training [59]. One important finding, not previously reported in the literature is the lack of awareness of existing KBs-related training opportunities; this may explain why most KBs depended on self-directed learning as well as on-job learning, despite their need for formal KB training [59]. There is a need to increase the KBs' awareness of the existing training opportunities, and increase the accessibility of those training through integrating virtual learning approaches to access a greater number of KBs.

This research exposed substantial needs for strengthening the KB role and its impact on practice change and research. First, the need for standard evaluation tools to evaluate KBs performance; this was consistent with findings from Newman et al. [94], that have emphasized the lack of evaluation for KBs practices, and if happened, it was informal evaluation. Although the literature on program evaluation has grown substantially in the past decade [98–100], that has not been adapted and adopted for evaluating KBs performance and practices. Dobbins et al. [101] recently suggested that KT researchers need to develop concrete and actionable indicators and tools to measure KBs practices. To this end, the outcomes-focused knowledge translation framework [102] may be adapted to evaluate KBs performance. This framework was proposed as a means to conceptualize how knowledge seekers can access and utilize information while receiving real-time feedback data about the outcomes [102]. The real-time feedback component fits well with the nature of the brokering process and constant networking of KBs with stakeholders. We encourage KBs to integrate evaluative frameworks into their practices in order to assess their impact by appropriate outcome measures. Determining objectives, activities, and outcomes specific to knowledge brokering might help in evaluating the effectiveness of knowledge brokering roles [94]. Second, participants suggested creating a provincial or national community of practice (CoP) for KBs to promote networking and information exchange among KBs and avoid work duplications. A CoP provides a vehicle to connect a group of individuals, with a shared concern, who might not otherwise have the opportunity to interact, share knowledge, identify solutions to common problems [103, 104]. Recent technological and social networking advancements facilitates the creation of numerous virtual CoPs, which allow connecting individuals from varying disciplines, contexts, and geographical locations [104].

## Future research

As personal attributes (characteristics and skills) seems to be essential to the success of KBs role [74], well-designed studies quantifying the impact of those attributes on KBs performance would be useful [74, 81]. Second, interventions to help improve on these attributes and skills should be developed and tested [81]. Third, an environmental scan that identifies and describe the existing educational training

opportunities for KBs would be beneficial. Fourth, there is a need for developing an evaluation framework and tool to monitor KBs performance. Lastly, establishing a national COP for KBs working in rehabilitation and evaluating its impact may be a way to help KBs network and stay abreast of the latest development in their field.

## Strengths And Limitations

This research provides new insights into the brokering activities from a range of rehabilitation settings in Canada, and into the facilitators and barriers they encounter when performing brokering activities. The data analysed were consistently blinded during coding and applying ratings to constructs, which increase the trustworthiness of the study's finding. Moreover, quantifying the CFIR domains to determine the magnitude of each theme across participants increases the trustworthiness of our interpretation. In addition, our sample size was consistent with previous studies employing the CFIR [105–108], and participants came from diverse professions, educational levels, and age groups. Nonetheless, our study is not without limitations. First, our participants were from five Canadian provinces only and nearly half were from Quebec. Further research exploring barriers and facilitators among KBs in other provinces would be needed. Second, this study was restricted to rehabilitation professionals, limiting the generalizability of our findings to other healthcare sectors. Third, we did not reach data saturation for all the CFIR domains (tension to change, relative priority, learning climate), and few of the CFIR domains (evidence strength and quality, adaptability, trialability, complexity) were not explored as they were deemed to be of low pertinence to the KBs roles.

## Conclusion

The novelty of this study centers around capturing potential barriers and facilitators to the optimal use of KBs within rehabilitation settings in Canada. Key individual determinants identified by participants included communication skills, clinical experience, and research skills. Organizational determinants included allowing a consistent networking and engagement with relevant stakeholders to promote the awareness of local needs, and enhancing the accessibility to physical (i.e. computers) and informational resources (i.e., latest research evidence). Strategies aiming to overcome barriers such as limited time and financial support to perform KBs roles should be considered. Key process level determinants were providing KBs training and utilizing evaluative tools for KBs performance. These findings may be useful to the organizations currently employing KBs to help improve their work productivity.

## Declarations

**Acknowledgments:** We thank *Dr Diana Zidarov* for interviewing French speaking participants, *Mr Julien Bachir*, *Miss Kalee Belanger*, and *Miss Melanie Christine Baniña* for helping analyze the data.

## Availability of data and materials

Some data generated or analyzed during this study are included in this published article. Additional data (generated and analyzed) are available from the corresponding author on reasonable request.

### **Ethics approval and consent to participate**

Ethical approval was obtained from the McGill University Institutional Review Board (Study Number A05-E25-18B). Participants were informed of the purpose of the research and their rights as participants to voluntary participation, anonymity, and confidentiality. Written consent was obtained from all participants.

### **Consent for publication**

Not applicable

### **Competing interests**

The authors declare that they have no competing interest

### **Funding**

No funding was sought for this study.

### **Authors' contributions**

DG developed data collection tool, collected, prepared data, coded, analysed and interpreted data. SA, AT, and AB contributed to the conceptualisation of the manuscript and critically reviewed the manuscript. All authors read and approved the final manuscript.

## **References**

1. Straus SE, Tetroe J, Graham I. Defining knowledge translation. *CMAJ*. 2009;181(3–4):165–8.
2. Wallis JA, Webster KE, Levinger P, Taylor NF. What proportion of people with hip and knee osteoarthritis meet physical activity guidelines? A systematic review and meta-analysis. *Osteoarthritis Cartilage*. 2013;21(11):1648–59.
3. Larmer PJ, Reay ND, Aubert ER, Kersten P. Systematic review of guidelines for the physical management of osteoarthritis. *Arch Phys Med Rehabil*. 2014;95(2):375–89.
4. Burridge J, Alt Murphy M, Buurke J, et al. A Systematic Review of International Clinical Guidelines for Rehabilitation of People With Neurological Conditions: What Recommendations Are Made for Upper Limb Assessment? *Front Neurol*. 2019;10:567.
5. Jolliffe L, Lannin NA, Cadilhac DA, Hoffmann T. Systematic review of clinical practice guidelines to identify recommendations for rehabilitation after stroke and other acquired brain injuries. *BMJ Open*. 2018;8(2):e018791.

6. Ni M, Hazzard JB, Signorile JF, Luca C. Exercise Guidelines for Gait Function in Parkinson's Disease: A Systematic Review and Meta-analysis. *Neurorehabil Neural Repair*. 2018;32(10):872–86.
7. Pogrebnoy D, Dennett A. Exercise Programs Delivered According to Guidelines Improve Mobility in People With Stroke: A Systematic Review and Meta-analysis. *Arch Phys Med Rehabil*. 2020;101(1):154–65.
8. Tomaschek R, Gemperli A, Rupp R, Geng V, Scheel-Sailer A. German-speaking Medical SCI Society (DMGP) Ergebniserhebung Guideline Development Group. A systematic review of outcome measures in initial rehabilitation of individuals with newly acquired spinal cord injury: providing evidence for clinical practice guidelines. *Eur J Phys Rehabil Med*. 2019;55(5):605–17.
9. Lomas J. Using 'linkage and exchange' to move research into policy at a Canadian foundation. *Health Aff (Millwood)*. 2000;19(3):236–40.
10. Lomas J. The in-between world of knowledge brokering. *BMJ*. 2007;334(7585):129–32.
11. Ward V, House A, Hamer S. Knowledge Brokering: The missing link in the evidence to action chain? *Evid Policy*. 2009;5(3):267–79.
12. Graham ID, Logan J, Harrison MB, et al. Lost in knowledge translation: time for a map? *J Contin Educ Health Prof*. 2006;26(1):13–24.
13. Metzler MJ, Metz GA. Analyzing the barriers and supports of knowledge translation using the PEO model. *Can J Occup Ther*. 2010;77(3):151–8.
14. Lencucha R, Kothari A, Rouse MJ. The issue is ... knowledge translation: a concept for occupational therapy? *Am J Occup Ther*. 2007;61(5):593–6.
15. Camden C, Swaine B, Tétrault S, Carrière M. Going beyond the identification of change facilitators to effectively implement a new model of services: lessons learned from a case example in paediatric rehabilitation. *Dev Neurorehabil*. 2011;14(4):247–60.
16. Craik J, Rappolt S. Theory of research utilization enhancement: a model for occupational therapy. *Can J Occup Ther*. 2003;70(5):266–75.
17. King G, Wright V, Russell DJ. Understanding paediatric rehabilitation therapists' lack of use of outcome measures. *Disabil Rehabil*. 2011;33(25–26):2662–71.
18. Ellen ME, Lavis JN, Ouimet M, Grimshaw J, Bédard PO. Determining research knowledge infrastructure for healthcare systems: a qualitative study. *Implement Sci*. 2011;6:60. Published 2011 Jun 6.
19. Chalmers I. If evidence-informed policy works in practice, does it matter if it doesn't work in theory? *Evid Policy*. 2005;1(2):227–42.
20. National Institute on Disability and Rehabilitation Research  
LaPlante MP, Carlson D. National Institute on Disability and Rehabilitation Research. *Disability in the United States: Prevalence and causes, 1992*. Washington (DC): U.S. Department of Education, Office of Special Education and Rehabilitative Services; 1996.

21. Elueze IN. Evaluating the effectiveness of knowledge brokering in health research: a systematised review with some bibliometric information. *Health Info Libr J.* 2015;32(3):168–81.
22. Dobbins M, DeCorby K, Twiddy T. A knowledge transfer strategy for public health decision makers. *Worldviews Evid Based Nurs.* 2004;1(2):120–8.
23. Zidarov D, Thomas A, Poissant L. Knowledge translation in physical therapy: from theory to practice. *Disabil Rehabil.* 2013;35(18):1571–7.
24. CHSRF. The Theory and Practice of Knowledge Brokering in Canada's Health System: A Report Based on a CHSRF National Consultation and a Literature Review December 2003. Canadian Health Services Research Foundation. 2003.
25. Heng HK, McGeorge WD, Loosemore M. Beyond strategy: exploring the brokerage role of facilities manager in hospitals. *J Health Organ Manag.* 2005;19(1):16–31.
26. Wahabi HA, Al-Ansary LA. Innovative teaching methods for capacity building in knowledge translation. *BMC Med Educ.* 2011;11:85.
27. Urquhart R, Porter GA, Grunfeld E. Reflections on knowledge brokering within a multidisciplinary research team. *J Contin Educ Health Prof.* 2011;31(4):283–90.
28. Dobbins M, Hanna SE, Ciliska D, et al. A randomized controlled trial evaluating the impact of knowledge translation and exchange strategies. *Implement Sci.* 2009;4:61.
29. Tran NT, Hyder AA, Kulanthayan S, Singh S, Umar RS. Engaging policy makers in road safety research in Malaysia: a theoretical and contextual analysis. *Health Policy.* 2009;90(1):58–65.
30. Ward VL, House AO, Hamer S. Knowledge brokering: exploring the process of transferring knowledge into action. *BMC Health Serv Res.* 2009;9:12.
31. McCormack B, Rycroft-Malone J, Decorby K, et al. A realist review of interventions and strategies to promote evidence-informed healthcare: a focus on change agency. *Implement Sci.* 2013;8:107.
32. Rogers EM. Lessons for guidelines from the diffusion of innovations. *Jt Comm J Qual Improv.* 1995;21(7):324–8.
33. Ryan DP, Marlow B, Fisher R. Educationally influential physicians: the need for construct validation. *J Contin Educ Health Prof.* 2002;22(3):160–9.
34. Yancey AK, Siegel JM, McDaniel KL. Role models, ethnic identity, and health-risk behaviors in urban adolescents. *Arch Pediatr Adolesc Med.* 2002;156(1):55–61.
35. Earp JA, Eng E, O'Malley MS, et al. Increasing use of mammography among older, rural African American women: results from a community trial. *Am J Public Health.* 2002;92(4):646–54.
36. Valente TW, Hoffman BR, Ritt-Olson A, Lichtman K, Johnson CA. Effects of a social-network method for group assignment strategies on peer-led tobacco prevention programs in schools. *Am J Public Health.* 2003;93(11):1837–43.
37. Perry CL, Komro KA, Veblen-Mortenson S, et al. A randomized controlled trial of the middle and junior high school D.A.R.E. and D.A.R.E. Plus programs. *Arch Pediatr Adolesc Med.* 2003;157(2):178–84.

38. Latkin CA. Outreach in natural settings: the use of peer leaders for HIV prevention among injecting drug users' networks. *Public Health Rep.* 1998;113(Suppl 1(Suppl 1)):151–9.
39. Sikkema KJ, Kelly JA, Winett RA, et al. Outcomes of a randomized community-level HIV prevention intervention for women living in 18 low-income housing developments. *Am J Public Health.* 2000;90(1):57–63.
40. Ammendolia C, Hogg-Johnson S, Pennick V, Glazier R, Bombardier C. Implementing evidence-based guidelines for radiography in acute low back pain: a pilot study in a chiropractic community. *J Manipulative Physiol Ther.* 2004;27(3):170–9.
41. Stevenson K, Lewis M, Hay E. Do physiotherapists' attitudes towards evidence-based practice change as a result of an evidence-based educational programme? *J Eval Clin Pract.* 2004;10(2):207–17.
42. Stevenson K, Lewis M, Hay E. Does physiotherapy management of low back pain change as a result of an evidence-based educational programme? *J Eval Clin Pract.* 2006;12(3):365–75.
43. Rebbeck T, Maher CG, Refshauge KM. Evaluating two implementation strategies for whiplash guidelines in physiotherapy: a cluster randomised trial. *Aust J Physiother.* 2006;52(3):165–74.
44. Gross DP, Lowe A. Evaluation of a knowledge translation initiative for physical therapists treating patients with work disability. *Disabil Rehabil.* 2009;31(11):871–9.
45. Rebbeck T, Macedo LG, Maher CG. Compliance with clinical guidelines for whiplash improved with a targeted implementation strategy: a prospective cohort study. *BMC Health Serv Res.* 2013;13:213.
46. Karlen E, McCathie B. Implementation of a Quality Improvement Process Aimed to Deliver Higher-Value Physical Therapy for Patients With Low Back Pain: Case Report. *Phys Ther.* 2015;95(12):1712–21.
47. Lynch EA, Cadilhac DA, Luker JA, Hillier SL. Education-only versus a multifaceted intervention for improving assessment of rehabilitation needs after stroke; a cluster randomised trial. *Implement Sci.* 2016;11(1):120.
48. Baskerville NB, Liddy C, Hogg W. Systematic review and meta-analysis of practice facilitation within primary care settings. *Ann Fam Med.* 2012;10(1):63–74.
49. Hoens AM, Reid WD, Camp PG. Knowledge brokering: an innovative model for supporting evidence-informed practice in respiratory care. *Can Respir J.* 2013;20(4):271–4.
50. Roxborough L, Rivard L, Russell D. Knowledge Brokering in Health Care. *CanChildCentre for Childhood Disability Research. Fact Sheet: Keeping Current.* .
51. Estabrooks CA, Thompson DS, Lovely JJ, Hofmeyer A. A guide to knowledge translation theory. *J Contin Educ Health Prof.* 2006;26(1):25–36.
52. Van Kammen J, Jansen CW, Bonsel GJ, Kremer JA, Evers JL, Wladimiroff JW. Technology assessment and knowledge brokering: the case of assisted reproduction in The Netherlands. *Int J Technol Assess Health Care.* 2006;22(3):302–6.
53. Van Kammen J, de Savigny D, Sewankambo N. Using knowledge brokering to promote evidence-based policy-making: The need for support structures. *Bull World Health Organ.* 2006;84(8):608–12.

54. Schleifer Taylor J, Verrier MC, Landry MD. What Do We Know about Knowledge Brokers in Paediatric Rehabilitation? A Systematic Search and Narrative Summary. *Physiother Can.* 2014;66(2):143–52.
55. Glegg SM, Hoens A. Role Domains of Knowledge Brokering: A Model for the Health Care Setting. *J Neurol Phys Ther.* 2016;40(2):115–23.
56. Cochrane LJ, Olson CA, Murray S, Dupuis M, Tooman T, Hayes S. Gaps between knowing and doing: understanding and assessing the barriers to optimal health care. *J Contin Educ Health Prof.* 2007;27(2):94–102.
57. Gaid D, Ahmed S, Alhasani R, Thomas A, Bussieres A. Determinants that influence knowledge brokers' and opinion leaders' role to close knowledge practice gaps in rehabilitation: A realist review. Manuscript submitted for publication to *J Eval Clin Pract.* August 5th 2020.
58. Gaid D, Ahmed S, Thomas A, Bussieres A. Profiling Knowledge Brokers in the Rehabilitation field across Canada: A descriptive study. Manuscript submitted for publication to *Health Res Policy Syst.* August 13th 2020.
59. Kislov R, Wilson P, Boaden R. The 'dark side' of knowledge brokering. *J Health Serv Res Policy.* 2017;22(2):107–12.
60. Hobbs FR, Taylor CJ. Academic primary care: at a tipping point? *Br J Gen Pract.* 2014;64(622):214–5.
61. Knight C, Lightowler C. Reflections of “Knowledge Exchange Professionals” in the Social Sciences: Emerging Opportunities and Challenges for University-Based Knowledge Brokers. *Evid Policy.* 2010;6(4):543–56.
62. Colorafi KJ, Evans B. Qualitative Descriptive Methods in Health Science Research. *HERD.* 2016;9(4):16–25.
63. Damschroder LJ, Aron DC, Keith RE, Kirsh SR, Alexander JA, Lowery JC. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. *Implement Sci.* 2009;4:50.
64. Archibald MM, Ambagtsheer RC, Casey MG, Lawless M. Using zoom videoconferencing for qualitative data collection: perceptions and experiences of researchers and participants. *Int J Qual Methods.* 2019;18:1609406919874596.
65. Kim H, Sefcik JS, Bradway C. Characteristics of Qualitative Descriptive Studies: A Systematic Review. *Res Nurs Health.* 2017;40(1):23–42.
66. Damschroder LJ, Hagedorn HJ. A guiding framework and approach for implementation research in substance use disorders treatment. *Psychol Addict Behav.* 2011;25(2):194–205.
67. Bernard HR. *Research methods in anthropology: Qualitative and quantitative approaches.* Rowman & Littlefield; 2017.
68. Krippendorff K. *Content analysis: An introduction to its methodology.* Sage publications; 2018.
69. Miles MB, Huberman AM. *Qualitative data analysis: An expanded sourcebook.* sage; 1994.

70. Escoffery C, Riehman K, Watson L, et al. Facilitators and Barriers to the Implementation of the HPV VACs (Vaccinate Adolescents Against Cancers) Program: A Consolidated Framework for Implementation Research Analysis. *Prev Chronic Dis.* 2019;16:E85.
71. Kegler MC, Beasley DD, Liang S, et al. Using the consolidated framework for implementation research to understand safety net health system efforts to increase colorectal cancer screening rates. *Health Educ Res.* 2018;33(4):315–26.
72. Liang S, Kegler MC, Cotter M, et al. Integrating evidence-based practices for increasing cancer screenings in safety net health systems: a multiple case study using the Consolidated Framework for Implementation Research [published correction appears in *Implement Sci.* 2016;11(1):130]. *Implement Sci.* 2016;11:109.
73. Elledge C, Avworo A, Cochetti J, Carvalho C, Grota P. Characteristics of facilitators in knowledge translation: an integrative review. *Collegian.* 2019;26(1):171–82.
74. Moore G, Redman S, Butow P, Haynes A. Deconstructing knowledge brokering for commissioned rapid reviews: an observational study. *Health Res Policy Syst.* 2018;16(1):120.
75. Jessani N, Kennedy C, Bennett S. The Human Capital of Knowledge Brokers: An analysis of attributes, capacities and skills of academic teaching and research faculty at Kenyan schools of public health. *Health Res Policy Syst.* 2016;14(1):58. Published 2016 Aug 2.
76. Dagenais C, Laurendeau MC, Briand-Lamarche M. Knowledge brokering in public health: A critical analysis of the results of a qualitative evaluation. *Eval Program Plann.* 2015;53:10–7.
77. Pennell KG, Thompson M, Rice JW, Senier L, Brown P, Suuberg E. Bridging research and environmental regulatory processes: the role of knowledge brokers. *Environ Sci Technol.* 2013;47(21):11985–92.
78. Scharff DP, Rabin BA, Cook RA, Wray RJ, Brownson RC. Bridging research and practice through competency-based public health education. *J Public Health Manag Pract.* 2008;14(2):131–7.
79. Bonawitz K, Wetmore M, Heisler M, et al. Champions in context: which attributes matter for change efforts in healthcare? *Implement Sci.* 2020;15(1):62.
80. Mallidou AA, Atherton P, Chan L, Frisch N, Glegg S, Scarrow G. Core knowledge translation competencies: a scoping review. *BMC Health Serv Res.* 2018;18(1):502.
81. Harvey G, Kitson A. PARIHS revisited: from heuristic to integrated framework for the successful implementation of knowledge into practice. *Implement Sci.* 2016;11:33.
82. Haynes AS, Derrick GE, Redman S, et al. Identifying trustworthy experts: how do policymakers find and assess public health researchers worth consulting or collaborating with? *PLoS One.* 2012;7(3):e32665.
83. Rivard LM, Russell DJ, Roxborough L, Ketelaar M, Bartlett DJ, Rosenbaum P. Promoting the use of measurement tools in practice: a mixed-methods study of the activities and experiences of physical therapist knowledge brokers. *Phys Ther.* 2010;90(11):1580–90.
84. Cameron D, Russell DJ, Rivard L, Darrah J, Palisano R. Knowledge brokering in children's rehabilitation organizations: perspectives from administrators. *J Contin Educ Health Prof.*

- 2011;31(1):28–33.
85. Russell DJ, Rivard LM, Walter SD, et al. Using knowledge brokers to facilitate the uptake of pediatric measurement tools into clinical practice: a before-after intervention study. *Implement Sci.* 2010;5:92.
  86. Anaby D, Korner-Bitensky N, Law M, Cormier I. Focus on participation for children and youth with disabilities: Supporting therapy practice through a guided knowledge translation process. *Br J Occup Ther.* 2015;78(7):440–9.
  87. Phoenix M, Rosenbaum P. Development and implementation of a paediatric rehabilitation care path for hard-to-reach families: a case report. *Child Care Health Dev.* 2015;41(3):494–9.
  88. Jackson-Bowers E, Kalucy L, McIntyre E. Focus on knowledge brokering. *Primary Health Care Research and Information Service.* 2006.
  89. Dobbins M, Robeson P, Ciliska D, et al. A description of a knowledge broker role implemented as part of a randomized controlled trial evaluating three knowledge translation strategies. *Implement Sci.* 2009;4:23.
  90. Bornbaum CC, Kornas K, Peirson L, Rosella LC. Exploring the function and effectiveness of knowledge brokers as facilitators of knowledge translation in health-related settings: a systematic review and thematic analysis [published correction appears in *Implement Sci.* 2015;10:171]. *Implement Sci.* 2015;10:162.
  91. Van Eerd D, Newman K, DeForge R, Urquhart R, Cornelissen E, Dainty KN. Knowledge brokering for healthy aging: a scoping review of potential approaches. *Implement Sci.* 2016;11(1):140.
  92. Norton TC, Howell C, Reynolds C. Exploratory study of the role of knowledge brokers in translating knowledge to action following global maternal and newborn health technical meetings. *Public Health.* 2016;140:235–43.
  93. Newman K, DeForge R, Van Eerd D, Mok YW, Cornelissen E. A mixed methods examination of knowledge brokers and their use of theoretical frameworks and evaluative practices. *Health Res Policy Syst.* 2020;18(1):34.
  94. Yousefi-Nooraie R, Dobbins M, Marin A, Hanneman R, Lohfeld L. The evolution of social networks through the implementation of evidence-informed decision-making interventions: a longitudinal analysis of three public health units in Canada. *Implement Sci.* 2015;10:166.
  95. Schleifer Taylor J, Verrier MC, Landry MD. What Do We Know about Knowledge Brokers in Paediatric Rehabilitation? A Systematic Search and Narrative Summary. *Physiother Can.* 2014;66(2):143–52.
  96. Bartelink ME, Baggen Y, Stevens DE, et al. Facilitators and barriers to brokering between research and care by senior clinical-scientists in general practice and elderly care medicine. *Educ Prim Care.* 2019;30(2):80–7.
  97. Abadie A, Cattaneo MD. Econometric methods for program evaluation. *Annu Rev Econom.* 2018;10:465–503.
  98. Kalu ME, Norman KE. Step by step process from logic model to case study method as an approach to educational programme evaluation. *Global J Educ Res.* 2018;17(1):73–85.

99. Guyadeen D, Seasons M. Evaluation theory and practice: Comparing program evaluation and evaluation in planning. *J Plan Educ Res*. 2018;38(1):98–110.
100. Dobbins M, Greco L, Yost J, Traynor R, Decorby-Watson K, Yousefi-Nooraie R. A description of a tailored knowledge translation intervention delivered by knowledge brokers within public health departments in Canada. *Health Res Policy Syst*. 2019;17(1):63.
101. Doran DM, Sidani S. Outcomes-focused knowledge translation: a framework for knowledge translation and patient outcomes improvement. *Worldviews Evid Based Nurs*. 2007;4(1):3–13.
102. Wenger E, McDermott RA, Snyder W. *Cultivating communities of practice: A guide to managing knowledge*. Harvard Business Press; 2002.
103. Bezyak JL, Ditchman N, Burke J, Chan F. Communities of practice: A knowledge translation tool for rehabilitation professionals. *Rehabilitation Research Policy Education*. 2013;27(2):89–103.
104. English M, Nzinga J, Mbindyo P, Ayieko P, Irimu G, Mbaabu L. Explaining the effects of a multifaceted intervention to improve inpatient care in rural Kenyan hospitals—interpretation based on retrospective examination of data from participant observation, quantitative and qualitative studies. *Implement Sci*. 2011;6:124.
105. English M, Wamae A, Nyamai R, Bevins B, Irimu G. Implementing locally appropriate guidelines and training to improve care of serious illness in Kenyan hospitals: a story of scaling-up (and down and left and right). *Arch Dis Child*. 2011;96(3):285–90.
106. Damschroder LJ, Lowery JC. Evaluation of a large-scale weight management program using the consolidated framework for implementation research (CFIR). *Implement Sci*. 2013;8:51.
107. Breimaier HE, Heckemann B, Halfens RJ, Lohrmann C. The Consolidated Framework for Implementation Research (CFIR): a useful theoretical framework for guiding and evaluating a guideline implementation process in a hospital-based nursing practice. *BMC Nurs*. 2015;14:43.

## Figures

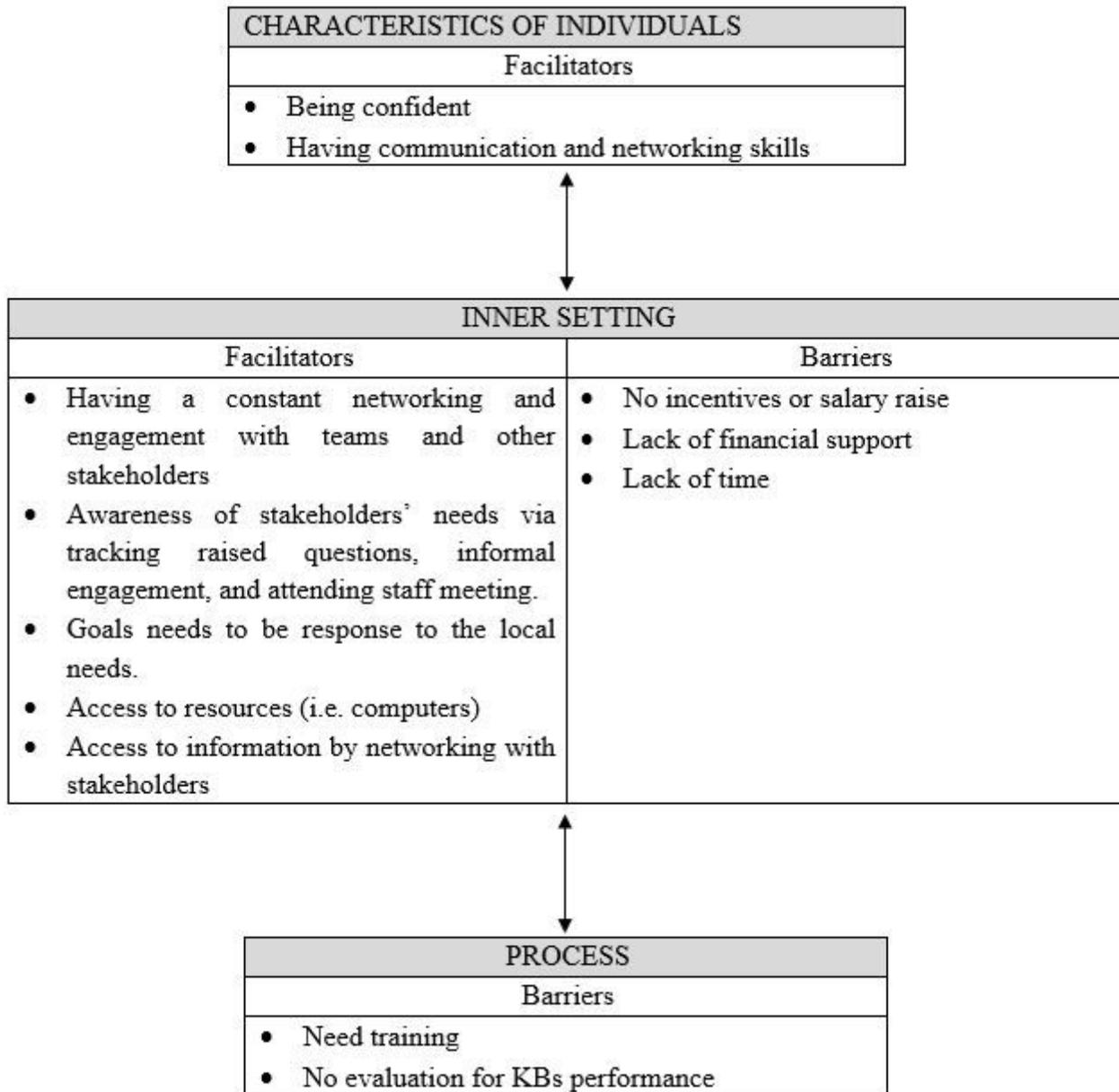


Figure 1

delineates salient barriers and facilitators (more than 75%) according to themes back to the CFIR.

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [KBQualitativeStudyAdditionalfile5.docx](#)
- [KBQualitativeStudyAdditionalfile4.docx](#)
- [KBQualitativeStudyAdditionalfile3.docx](#)

- [KBQualitativeStudyAdditionalfile2.docx](#)
- [KBQualitativeStudyAdditionalfile1.docx](#)