

Barriers and Facilitators for Implementation of a Patient Prioritization Tool in Rehabilitation Settings

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Abstract

Introduction. Prioritization tools aim to manage access to care by ranking patients equitably in waiting list based on determined criteria. Patient prioritization has been studied in a wide variety of clinical health services, including rehabilitation contexts. We created a web-based patient prioritization tool with the participation of stakeholders in two rehabilitation programs, which we aim to implement into clinical practice. Successful implementation of such innovation can be influenced by a variety of determinants. The goal of this study was to explore facilitators and barriers to the implementation of a patient prioritization tool in rehabilitation programs.

Methods. We used two questionnaires and conducted two focus groups among service providers from two rehabilitation programs. We used descriptive statistics to report results of the questionnaires and qualitative content analysis based on Consolidated Framework for Implementation Research.

Results. Key facilitators are the flexibility and relative advantage of the tool to improve clinical practices and produce beneficial outcomes on patients. Main barriers are the lack of training, financial support and human resources to sustain the implementation process.

Conclusion. This is the first study that highlights organizational, individual and innovation levels facilitators and barriers for the implementation of a prioritization tool from service providers' perspective.

Contributions to the literature

Methods used in this study could be operationalized in future studies to investigate barriers and facilitators of the implementation of an innovative intervention in rehabilitation settings.

We used a well-known implementation framework (CFIR) to classified the determinants of the implementation, which could help to compare the results with other similar studies in implementation science.

The barriers and facilitators identified in this study are an important first step in the implementation process of a patient prioritization tool in rehabilitation programs.

Introduction

In the past few years, the number of studies about patient prioritization tools (PPT) has increased [1–3]. These tools aim to manage access to care by ranking patients equitably and rigorously in waiting lists based on criteria, so that those with urgent needs receive services before those with less urgent needs [1, 4]. Patient prioritization, as a waiting list management strategy, has been studied in a wide variety of clinical health services, such as orthopaedic surgery [5–12], varicose vein surgery [13], cataract surgery [8, 14–21], cardiac surgery [22, 23], psychotherapy services [24], and other mental health services [25–28]. These studies described the use of PPTs to prioritize patients waiting for elective services, but few authors studied prioritization in other settings, such as rehabilitation contexts [29–32]. Development of

PPTs implies a decision-making process to select criteria according to which patient prioritization will be decided [4]. Decisions about these criteria and development process of PPTs are often not standardized [33], and there is a lack of synthesis of evidence about what constitutes a PPT [34].

To help standardize and operationalize patient prioritization in rehabilitation programs, we created a personalized web-based tool with the participation of stakeholders of two rehabilitation programs. We asked stakeholders individually and in consensus group sessions to elicit and select criteria that he/she considered most important for patient prioritization in their respective program. We included these criteria into the web-based application where patients are assessed based on these criteria. The tool generates scores for patients and automatically orders them using this priority score.

Despite the fact that PPTs have been widely studied across healthcare services, only few have attempted to experiment implementation in rehabilitation settings [29, 35, 36]. Successful implementation of a new practice or an innovation into clinical practice can be influenced by a variety of determinants [37]. In rehabilitation settings, organizational factors were perceived to be an important determinant of implementation, but future studies are needed to improve our understanding of the implementation [38]. It is recommended to investigate key facilitators and barriers (F&B) of individuals and their environment when tailoring knowledge translation processes to achieve successful uptake with the knowledge users [39].

Implementation of PPTs may be complex considering it requires an important change in practice for users [35, 40], but it has been studied mainly in the context of elective surgeries [40–42]. Resistance to change is noted because users rarely see the benefits of changing and they believe that the tools need to be easier, simpler and quicker to use [41, 42]. It is important to take into consideration tool characteristics, such as flexibility and simplicity, before implementation [8]. Thus, all health professionals and managers must be involved in the implementation process of a PPT and it is also necessary to supervise its application into clinical practice [8]. Challenges towards the implementation of a PPT, such as the number of criteria that must be included, can be complex and can result from the different perspectives of professionals involved in the administration of the tool, about the tool and the prioritization process [41].

Harding et al. [35] studied the implementation of a new practice of prioritization to improve access to rehabilitation services. Clinicians in this study noted the importance of effective change management organizational change principles, such as leadership and regular meetings to maintain communication during the implementation process [35]. Hence, innovation or practice change has to go through a robust knowledge translation process to guarantee implementation success, especially when it involves multiple stakeholders and it relates to a complex decision about delivery of care [43]. In multidisciplinary contexts, such as rehabilitation programs, it is crucial to build a common vision and to explore stakeholders' perspectives on the implementation of an innovation. Knowledge translation models show that assessing F&B for implementation is a central part of a knowledge translation process [44]. However, there is a

paucity of literature about F&B for the implementation of PPTs, especially in rehabilitation settings. The goal of this study was to explore F&B for the implementation of a PPT in two rehabilitation programs.

Methods

Design and settings

We conducted a mixed-method design study [45] using two questionnaires and focus groups (FG) among service providers from two rehabilitation programs at the *Centre intégré universitaire de santé et de services sociaux de la Capitale-Nationale* (CIUSSS-CN) in Quebec City (Canada). Palinkas et al. [45] suggest to use mixed method designs in implementation research, because they reflect a balanced structure and use of convergence, complementarity, expansion, and sampling to understand F&B to implementation. We chose simultaneous collection and analysis of quantitative and qualitative data considering the explorative purpose of the study. We used the Standards for Reporting Implementation Studies (StaRI) statement [46] and completed the checklist [see Additional file 3].

The team research developed two personalized PPTs for rehabilitation programs, so we recruited members of these two programs to collaborate in the study, i.e. 1) a driving evaluation program (DEP) and 2) a compression garment manufacturing program (CGMP) for burn victims. We selected these two programs based on their experiences related to prioritization process difficulties. Both programs had a substantial number of referrals to manage in their waiting list and they had to deal with a variety of factors that can be considered for patient prioritization.

The DEP offers a range of specialized rehabilitation services related to driving skills, mostly to outpatients with physical and intellectual disabilities. The CGMP team (n = 10) customizes compression garments for burn victims during their inpatient or outpatient rehabilitation. See Additional file 2 for supplementary information about these rehabilitation settings.

Conceptual model

We based our study on the Consolidated Framework for Implementation Research (CFIR) [37]. This broad conceptual model of knowledge translation guides documenting and analyzing F&B to implementation in clinical practice. According to this framework, the implementation can be influenced by the intervention's characteristics, the outer setting, the inner setting, the characteristics of the individuals involved and the implementation process itself. The authors of the framework suggest choosing specifically only most relevant domains to fit with your intervention and context [47].

Participants

We recruited participants from the two rehabilitation programs aiming to obtain between 4 and 8 participants in each group. This sample size would allow participants to easily express themselves in FG. We targeted rehabilitation service providers that were directly or indirectly in contact with patients of their program, such as clinicians, clinical coordinators and managers. We contacted participants directly by

email to explain the project and obtain their consent to participate. Inclusion criteria were to have been working in the program for at least 6 months, to work for a minimum of 3 days/week and to have been a participant in the prior consultation for selecting prioritization criteria.

Procedure

We convened participants of each program to a meeting where we first presented the PPT and answered questions from participants about the tool for about 30 minutes. Then, we asked participants to complete the two questionnaires described below and conducted a FG. We held two group meetings, one with each team of rehabilitation service providers. Two moderators helped to guide discussions during group sessions. Discussions were audio recorded and transcribed verbatim.

Data collection tools

Figure 1 represents all the CFIR domains that we wished to document in this study. We also incorporated in this figure (in parentheses) the two questionnaires that document *inner setting* and *characteristics of the individuals*. We included two standardized measures to document these two domains in depth, individual and organization characteristics, considering that these domains could have more important influence on the implementation [38]. We therefore chose the Determinants of Implementation Behavior Questionnaire (DIBQ) [48] and the Organizational Readiness for Knowledge Translation (OR4KT) [49].

The DIBQ allows selection of a small number of items [50], so we used a French version of this questionnaire comprising 28 items based on nine determinants (i.e. *knowledge, skills, professional role, self-efficacy, intentions, memory/attention, organization, and subjective norm*). This questionnaire describes individual behaviours and attitudes that could influence the implementation of an innovation, such as the PPT. Participants scored their level of agreement for each item on a five-point Likert scale (ranging from 1: strongly disagree to 5: strongly agree).

The second questionnaire was the French version of the OR4KT designed to measure the readiness of healthcare organizations to implement evidence-informed change across a variety of services [49]. It comprised 59 items grouped under six dimensions (*organizational climate for change, organizational contextual factors, change content, leadership, organizational support, motivation*). This tool documents the perception of participants about their organization and how they consider it prepared to face changes, such as the implementation of a PPT. Respondents scored their level of agreement for each item on a five-point Likert scale (ranging from 1: strongly disagree to 5: strongly agree). Sociodemographic and occupational questions were added at the end of the questionnaires.

FG discussions were guided through open-ended questions about all five major domains of the CFIR, i.e. *intervention characteristics, outer setting, inner setting, characteristics of the individuals involved, and the process of implementation* [37] in order to have a complete portrait of the F&B of PPT implementation in these contexts.

Figure 1. A representation of CFIR domains from Damschroder et al. (2009)

Analysis

Given the small numbers of respondents and the goal of the study, we used descriptive statistics (frequency distribution) to report results of the two questionnaires. We first analyzed data collected from questionnaires regarding to each item separately and then summed items from each domain. We divided results based on Likert scale, i.e. agree (4 or 5), neutral (3) and disagree (1 or 2). For FG, we based our analysis on CFIR domains and we used qualitative thematic analysis [51] from the verbatim. We coded relevant group quotes using CFIR determinants as codes. Verbatim were coded by the first author of this manuscript using qualitative analysis software (NVivo). A second reviewer corroborated the codifications and disagreements were discussed until consensus was reached. A final analysis was performed by selecting most relevant extracts to report results and to answer the research objective. We also counted the number of times each determinant was mentioned in the FG and synthesized all F&B in Table 2.

Considering that both programs are located under the same organization and that they both offer inpatient and outpatient rehabilitation services, we performed our analysis regrouping data from both groups in order to have a broader picture of determinants for implementation.

Results

Characteristic of the sample

Service providers (n = 13) from two rehabilitation programs participated in the study. They all completed the two questionnaires and participated in one of the FG. Table 1 shows characteristics of the participants. We had a broad variety of participants including clinicians, managers, coordinators, which represented the main stakeholders related to prioritization practice in each rehabilitation program. All participants were also involved in the selection of prioritization criteria phase, which was the first phase of the PPT development.

Table 1
Sociodemographic and occupational characteristics of respondents in each program

		CGMP (n = 9)	DEP (n = 4)
Age (years)	Mean	47.2	49.3
	SD	9.7	3.1
Sex	Men	-	-
	Women	9	4
Workplace	Rehabilitation centre	7	4
	Hospital	2	-
Occupation	Tailor	2	-
	Manager	2	-
	Driving instructor	-	-
	Coordinator	1	1
	Clinician	4	3
Years of experience in occupation	Mean	12.4	18.5
	SD	9.7	9.5
Education / Area of expertise	Fashion design	2	-
	Nursing	1	-
	Occupational therapy	4	3
	Physiotherapy	2	-
	Social work	-	1

Table 2

Synthesis of F&B reported by participants from FG and questionnaires based on CFIR domains.

Domains	Source	Facilitators	Barriers
Intervention characteristics	FG	<p><i>Adaptability:</i> flexibility of the tool to adapt local prioritization practice (9), easy to change scores depending on the patient condition (3), tool specific to the program (2), clarity and objectivity of the tool (2).</p> <p><i>Relative advantage:</i> reducing workload for the clinical coordinators or clinicians (5), improving reliability and sensitivity of patient prioritization process (4), objectivity and consistency in the patient prioritization process (3), patients in need will receive services sooner (3), time saving (1).</p> <p><i>Complexity:</i> short duration / few days to start implementation (1).</p> <p><i>Design quality & packaging:</i> user-friendly (1), good look/well designed (2).</p> <p><i>Intervention source:</i> stakeholders participating in tool development (1)</p> <p><i>Trialability:</i> interested to test it first (2)</p> <p><i>Evidence strength & quality:</i> promotes evidence-based prioritization practice (1)</p>	<p><i>Complexity:</i> difficulty/complexity to find information in order to score with the tool (9), it is an additional task (2)</p> <p><i>Design quality & packaging:</i> a lot of useless "buttons" (1).</p> <p><i>Intervention source:</i> developed externally (3)</p> <p><i>Cost:</i> expensive to operate (2)</p>
Outer setting	FG	<p><i>Patient needs & resources:</i> easy to inform patients about waiting list management (3), patient can contribute to improve tool (1).</p> <p><i>Cosmopolitanism:</i> networking with other organizations to improve access to service (3)</p> <p><i>Peer pressure:</i> similar prioritization tools used by other programs (2).</p>	<p><i>Patient needs & resources:</i> patient's pressure to receive services sooner (3), will not meet patients' needs (2), increase of population (1), patient not ready to receive services (1).</p> <p><i>External policy & incentives:</i> priority-setting by healthcare system (1)</p>

Domains	Source	Facilitators	Barriers
Inner setting	OR4KT	<p><i>Organizational climate for change:</i> staffs work together as a team, help one another when needed.</p> <p><i>Organizational contextual factors:</i> professionals want to improve patient care</p> <p><i>Change content:</i> changes should be effective and based on current scientific knowledge</p> <p><i>Leadership:</i> managers ask for results, clinicians and managers are involved in change processes</p> <p><i>Organizational support:</i> staff members make pressures to change</p>	<p><i>Organizational contextual factors:</i> lack of financial support and staffing numbers in their organization</p> <p><i>Organization support:</i> formal mechanism is not established for obtaining feedback related to the proposed change.</p> <p><i>Motivation:</i> patients, supervisors and funding organizations do not make pressures to make changes.</p> <p><i>Leadership:</i> not all professionals were involved in decision processes</p>
	FG	<p><i>Structural characteristics:</i> only few tool users / small team (2), presence of clinical coordinators (1).</p> <p><i>Networks & communications:</i> good teamwork and communication (2), trust in each other about prioritization (1)</p> <p><i>Culture:</i> equity values fostered (1)</p> <p><i>Tension for change:</i> perception that actual prioritization process less suitable (4).</p> <p><i>Compatibility:</i> tool fits with actual practice and processes (3)</p> <p><i>Learning climate:</i> used to this kind of change (1)</p> <p><i>Leadership engagement:</i> willingness of the managers (2)</p> <p><i>Available resources:</i> external support available from organization (1)</p>	<p><i>Structural characteristics:</i> staff turnover (1), wide territory coverage (1), frequent infrastructure changes (1).</p> <p><i>Culture:</i> disinterest of the waiting list management (1)</p> <p><i>Tension for change:</i> perception that actual prioritization tool is better (1).</p> <p><i>Compatibility:</i> tool use may not fit with actual practices and processes (3), confidentiality issues (3), incompatibility with the organization's systems (2), problems with clinical assignments (1).</p> <p><i>Leadership engagement:</i> need for authorizations by decision makers (1)</p> <p><i>Available resources:</i> lack of human resources to support the implementation (2), lack of time for tool use (2), not a good timing for implementation (1), need for more computers (1), lack of financial support (1).</p>

Domains	Source	Facilitators	Barriers
Characteristics of individuals	DIBQ	<p><i>Outcome expectancies:</i> beneficial outcomes on the patients by using the tool</p> <p><i>Subjective norm:</i> colleagues' opinions favourable about the use of the tool</p> <p><i>Intentions:</i> high intention to use it with their patients</p>	<p><i>Memory/attention:</i> difficulty to focus attention during tool use.</p> <p><i>Skills:</i> no former experience using the tool, not trained to use it.</p> <p><i>Characteristic of the organization:</i> concerned about financial support for tool use, a lack of networking within their program to support tool use.</p>
	FG	<p><i>Knowledge & beliefs about the intervention:</i> think it will be easier to prioritize (3).</p> <p><i>Self-efficacy:</i> think they will be able to use the tool (3).</p> <p><i>Individual stages of change:</i> ready/enthusiastic to use in their practice (2).</p>	<p><i>Knowledge & beliefs about the intervention:</i> difficulty understanding the functions/characteristics of the tool (7), believe that the tool will not significantly change waiting list management (3).</p> <p><i>Self-efficacy:</i> feel that they don't have the abilities to use the tool (3).</p> <p><i>Individual stages of change:</i> express some resistance to change (3).</p>

Individual determinants

All answers of the DIBQ (n = 13) are summarized in Fig. 2 by regrouping items under their respective determinants. It shows the frequency of participants' answers (strongly disagree to strongly agree) for each of the determinants included in the questionnaire. Details of frequency distributions for each item are presented in the appendix [see Additional file 1].

The two determinants most frequently scored 4 or 5 were *outcome expectancies* (92,3%) and *subjective norm* (92,3%), followed by *knowledge* (75,0%) and *intentions* (74.4%). *Outcome expectancies* are related to the beneficial outcomes for the patients related to the use of the PPT, which means that participants agree that this tool could be beneficial for patients in their program. Items from the *subjective norm* indicate that participants consider colleagues' opinions favourable about the use of the PPT.

The majority (74%) of the items were more frequently scored 4 or 5 (including item 7 which was worded in a negative form). For item 28, participants had to indicate on a scale from 1 to 10 with how many patients they planned to use the PPT. The mean score for this item was 9.2, which indicates a globally very high intention to use it with their patients.

In contrast, the following 7 items (26%) from 4 determinants were more frequently scored from neutral to strongly disagree on the scale. One third (33%) disagreed or strongly disagreed for items related to *memory/attention* and *skills*. Related to these determinants, 3 items (12, 20 and 27) were scored particularly low, i.e. less than 3 on the Likert scale. Items 12 and 27 are related to a difficulty to focus attention during PPT use and Item 20 is related to their former experience using the PPT, which indicates that participants need to test the tool in order to trust their capabilities to use it. Based on answers of the item 5, 5 participants felt that they were not trained to use PPT. There was a neutral tendency related to the *characteristic of the organization*, which shows that most participants are concerned about financial support for PPT use (item 9), and that there is perhaps a lack of networking within their program to support PPT use (item 17).

Organizational readiness to change

As displayed in Figure 3, the dimensions that participants had a most positive perception were *change content* (72,6%), *organizational climate for change* (70,8%), *leadership* (69,2%) and *organizational contextual factors* (67,7%).

On the item level [see in Additional file 1], the most frequently rated 4 and 5 in *organizational climate for change* were that staffs work together as a team (12/13), and help one another when needed (13/13). *Organization contextual factors* regarding professionals want to improve patient care (3 items with 13/13), which indicate that staffs are willing to cooperate and experiment to improve clinical procedures. The *content of change* seems important for participants, when they noted that changes should be effective and based on current scientific knowledge (12/13). About *leadership* in their organization, managers ask for results (13/13), clinicians and managers are involved in change processes (12/13 and 13/13), which highlight the fact that diverse stakeholders participated in changes. Related to the *organizational support*, majority of the participants (12/13) felt that staff members make pressures to change, which could be beneficial to maintain their engagement in the change process.

Figure 3 shows that *organizational support* and *motivation* were the two dimensions that participants more frequently scored from 1 or 2 on the Likert scale. On the item level, there was only one item where most of the participants disagreed (7/13), which was related to a lack of motivation of funding organizations to make pressures for changes. Then, there were 7 items that 4 or 5 participants scored 1 or 2 on the Likert scale. First, they expressed the lack of financial support and staffing in their organization (*organizational contextual factors*). Second, results suggest that patients and supervisors do not make pressures to make changes in their organization (*motivation*), and that there is not much available information for similar innovation uses in other organizations (*motivation*). Third, some participants suggest that not all professionals were involved in the decision process (*leadership*). Finally, participants indicated that formal mechanisms were not established for obtaining feedback related to the proposed change (*organization support*).

Results from FG

This section presents the results from the two FG held with the service providers. We linked F&B for implementation mentioned by participants to the domains of the CFIR. We selected verbatim quotations, we present below the main points of the analysis and we put in parentheses the number of times each F&B was mentioned by participants. French quotations have been translated into English.

Intervention characteristics

The first CFIR domain is associated with the characteristics of the innovation we wish to implement into clinical rehabilitation programs. The *adaptability* of the tool was reported to be a major facilitator for implementation, mostly regarding the flexibility of the tool to adapt to local prioritization practice (9): “we could try to improve it [...], just small details that could make it more user-friendly for users”. Participants also noticed that the tool would be easy to use, to adapt to the population and to the patient’s condition (3): “if the person just had a new diagnosis [...], you’ll be able to add it, update it”.

The *relative advantage* of the innovation was also highlighted by participants, beginning with the insight that the PPT will reduce workload for the clinical coordinators or clinicians (5): “I imagine that for the coordinator, it removes workload at her level”. Some participants perceived that PPT could improve the reliability and the sensitivity of patient prioritization processes (4): “I think the right patients are going to have the right garments in the right time, more than currently”.

In contrast, the *complexity* of the tool appears to bring some potential barriers to implementation. One is related to the difficulty to find information about the patients in order to score and prioritize them (9): “I will not necessarily search for information about the 100 clients placed on the waiting list”. Another barrier mentioned by the participants was related to the *intervention source*, where some participants expressed their concerns from the fact that the tool is developed by an external organization: “that’s the risk of research projects, you do that and at some point, there is no longer one to rely on”.

Outer setting

Globally, service providers discussed about this domain less than other ones, but they were able to point out a few F&B related to the outer setting. Facilitators exposed by participants are related to the *patient needs & resources*, because patients make pressures to receive services faster (3) and participants thought the tool would inform patients about waiting list management (3): “patients call and I have to explain to them [...], so when we have tools like that it’s easier, I’m able to tell them”. Also, *cosmopolitanism* was indicated to be a facilitator, as participants presented that their organization is developing networks with other organizations to improve access to rehabilitation service (3): “at the last trauma symposium, we met with all the regional committee chairs in our territory, and we talked to them”. This can contribute in helping the program receive support by other organizations when they face a patient increase or other access challenges related to the prioritization process.

Inner setting

Other organizational determinants that could influence the implementation of PPTs on a smaller level were reported. In the studied organization, there was a *tension for change*, which could facilitate the implementation of a new prioritization practice, because clinicians perceived that actual prioritization process was less suitable than the one proposed (4): “I am not comfortable with Excel, so with [PPT], we would really be in business”. The *compatibility* was also a determinant often mentioned, sometimes as a facilitator but by others as a barrier. Indeed, participants considered that the tool would fit with actual practices and processes in their local contexts (3): “people are used to already using tools, [...] we set things, it should be easy”.

Contrarily, some providers saw a barrier from the *compatibility*, as they suggested that the tool proposed may not fit with actual practices and processes (3): “I can do the analysis of patient’s file four months later, so if we have a system like that, we want to have the information right away”. Issues of confidentiality of the system were also brought up a few times (3), which can impede the implementation of the tool: “my question, before applying it, we must make sure we meet the confidentiality rules”.

Characteristics of individuals

Service providers are potential users of the tool, and their individual characteristics could influence implementation as well. Participants expressed thoughts on their *knowledge & beliefs about the intervention*. They expressed that it will facilitate and be easier to prioritize with the PPT (3): “it seems to work all by itself, this is the goal, right? That there is less analysis to be done necessarily”. Another characteristic of individuals that could have an impact on the tool implementation is the *self-efficacy* related to the potential use of the tool, and some participants already perceived that they would be able to use the tool (3): “I think it’s our task, it’s already rooted in what we are already doing, it’s like improving”.

Barriers are also noted in terms of *knowledge & beliefs about the intervention*, as other participants specified that they encountered some difficulties understanding the functions/characteristics of the tool (7): “you presented us the tool, there may be some elements that we obviously do not have in hand and that we do not understand 100% yet”. There are even some individuals that said that the tool would not significantly change waiting list management as far as they were concerned (3): “what it will do in real life for these people? They will be seen just a few weeks before, not a major difference”. Other barriers were stated by participants, one about *self-efficacy*, as they considered that they did not have the abilities yet to use the tool (3). They expressed the lack of indication related to the scoring and management of prioritization criteria: “There are criteria that I find very easy [...] there are others that I do not know how we will be able to evaluate”. The other barrier was about *individual stages of change*, which specifies that some participants may not be ready yet to use the tool, as they expressed some resistance to change (3): “what would stop us from calculating as we do there, we calculate [the score], without filling each time and using the software”.

Other domains

There are other concepts from the CFIR framework that did not emerge during FG. For example, service providers did not mention F&B related to the implementation process, as they were questioned about determinants prior the implementation of the tool. They also did not mention determinants about *relative priority, organizational incentives & rewards, goals and feedback, access to knowledge, individual identification with organization, and other personal attributes*.

Synthesis of F&B to PPT implementation

As described in the previous sections, implementation of a tool in clinical settings can be facilitated or impeded by a variety of determinants from different levels. We synthesized all results in Table 2.

Insert Table 2 here

Discussion

The goal of the study was to explore determinants of the implementation of a PPT in rehabilitation settings. We asked service providers, mostly clinicians, to express their thoughts about F&B that could influence the use of this innovation. Our findings suggest that F&B originate mainly from organizational factors, characteristics of the individuals involved and from characteristics of the PPT. No determinant about the implementation process emerged from our results.

Our findings support the conception that implementation in rehabilitation contexts, as in others contexts, is a complex phenomenon influenced by many determinants [39, 52, 53]. In our context, we showed that it is important to focus on having a flexible and simple tool to make sure that clinicians perceive that it contributes to reduce workload in their practice. The determinants elicited from our study could help to tailor interventions to overcome the specific barriers in the clinical contexts studied [52, 54]. For example, we could suggest to offer trainings or distribution of educational materials to potential tool users in order to improve their self-efficacy and to limit their misunderstanding about the tool [53, 55]. Then, to increase readiness of the organization, stakeholders, such as managers, decision makers, and patients should be involved in the implementation process [56]. Finally, a special attention should be paid to the lack of financial support and human resources available to foster tool implementation.

Overall, our findings do not differ from those of other studies assessing F&B to implementation in clinical practice. Gravel and colleagues [57] identified the most reported F&B by health professionals implementing shared decision-making. The main barriers they found were time constraints, lack of applicability due to patient characteristics and due to the clinical situation; facilitators included provider's motivation, positive impact on the clinical process and positive impact on patient outcomes [57]. Innovation should be adapted to meet clinical practice and be specific to patients' needs and characteristics. It should also have positive impact on clinical process (reducing workload), and on patient outcomes (receiving services sooner). Bayley and colleagues [58] described the barriers to the implementation of evidence-based recommendations for stroke rehabilitation experienced by nurses, occupational therapists, physical therapists, physicians and hospital managers. They found that the

most commonly noted barriers to implementation were lack of time, staffing issues, training/education, therapy selection and prioritization, equipment availability and team functioning/communication [58]. Similar barriers were noted in our study as well, while team functioning/communication was also mentioned, but was related to a facilitator to the implementation in our contexts. In a similar study [59], the themes influencing implementation of rehabilitation guidelines emerged were facilitation, agreement with the intervention, familiarity with the recommended treatments, and environmental factors (including time pressure, insufficient staff, lack of space and equipment, and organizational constraints). Thus, there are some similarities between F&B to implement a PPT into rehabilitation settings and implementation of other interventions in healthcare.

Few studies present multiple stakeholders' perspective related to PPT implementation and change of prioritization practice [35, 40]. Benefits expressed by clinicians, i.e. patients reassurance, more autonomy for clinicians and increase of work efficiency [35] are positive outcomes that can be related to facilitators reported in our study, regarding relative benefits for clinicians and patients. In contrast, implementation of a surgical PPT has experienced barriers, which was not providing a transparent or equitable method to prioritize patients, and the concept of equity was understood differently by surgeons [40]. These barriers were related to the lack of compatibility with actual prioritization practice and lack of common vision about prioritization, which were highlighted in our study. The complexity of the implementation can be partly explained by the fact that patient prioritization in waiting lists is a decision which encompasses ethical challenges [60, 61]. Having a common vision about prioritization in a team, such as in a rehabilitation program, can lead to a clash of values related to equity. Clinicians felt a tension between what they thought they should be doing for their patients and their actual ability to provide high-quality care [61]. Laliberté et al. [61] suggested to improve training and combine with research on evidence-based practices to document current weaknesses, and to identify waiting list management procedures that can make resource allocation decisions more equitable and transparent.

Our study stands out from others by its mixed data collection process, as we combined data from two questionnaires and two FG to gather providers' perceptions about F&B. We believe that this method offered to providers better opportunities to express themselves about implementation determinants, and allowed us to obtain a broader variety of opinions. Our findings demonstrated some convergence between results from questionnaires and FG, which can support the applicability of mixed methods research to document implementation determinants.

To our knowledge, this is the first study exploring F&B of a PPT in rehabilitation settings. We are aware that future studies are needed to support our findings and to be able to generalize for other rehabilitation contexts. We believe that the results of our study helped to gain a better understanding of what could influence the implementation of an innovation in clinical rehabilitation settings. They can also guide rehabilitation stakeholders to focus on more adapted implementation strategies, as proposed by Powell et al. [62], such as plan strategies (e.g. identify champions, involve patients), educate strategies (e.g. educational materials) and finance strategies (e.g. access new fundings).

There are some limits from our study. First, the explorative purpose of the study led us to collect data (quantitative and qualitative) simultaneously, which limited the way data from questionnaires and FG could inform each other. We, therefore, could have had different results with a consecutive data collection process, for example by producing more focused questions and discussions in FG derived from questionnaire results. Second, one of the groups was small (DEP, n = 4), so it is difficult to state that all F&B were discussed in this group and that data saturation was obtained. Therefore, we considered all participants, from both groups, to be part of the same organization, which led to a reasonable sample of 13 participants. Furthermore, in our study, we only collected data regarding two rehabilitation programs. This certainly limits the generalizability of our findings to other settings.

Conclusion

This study is the first to explore determinants of implementation for a PPT in clinical rehabilitation settings. Findings highlight that providers' perceptions about F&B to implementation could be from an organizational, individual or innovation level. These determinants allow clinicians, managers, decision makers and researchers to have a better understanding of the implementation into rehabilitation settings. We hope the results of this study will contribute to future research aiming to document development, uses and implementation of PPTs in clinical settings, especially within the context of rehabilitation.

Abbreviations

CFIR

Consolidated Framework for Implementation Research;

CGMP

compression garment manufacturing program;

CIUSSS-CN

Centre intégré universitaire de santé et de services sociaux de la Capitale-Nationale;

DEP

driving evaluation program;

DIBQ

Determinants of Implementation Behavior Questionnaire;

F&B

facilitators and barriers;

FG

focus group;

OR4KT

Organizational Readiness for Knowledge Translation;

PPT

patient prioritization tool.

Declarations

Ethics approval and consent to participate

CIUSSS-CN Ethic Committee granted full ethic approval (reference EMP-2017-587) and *Centre Hospitalier Universitaire de Québec-Université Laval* Ethic Committee approved the project as well to probe service providers from their institution. All participants answered a consent form, which presented potential consequences of the study, prior to participating. They were free to decline the invitation to the project or to quit it whenever they wanted.

Consent for publication

Not applicable

Availability of data and materials

All data generated or analyzed during this study are included in this published article and its supplementary information files.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

JD and MEL conceptualized the design of the study. JD collected and analyzed data, which were validated by MEL. JD and MEL drafted the manuscript and AR, FR and VB revised it. All authors read and approved the final manuscript.

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