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Implementation considerations for delivering inpatient COVID rehabilitation: A qualitative study

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Abstract

Rationale: Patients recovering from significant COVID-19 infections benefit from rehabilitation; however, aspects of rehabilitative care can be difficult to implement amidst COVID infection control measures.

Aims and Objectives: We used the Consolidated Framework for Implementation Research (CFIR) to evaluate the rapid implementation of a COVID zone in an in-patient rehabilitation hospital at the onset of the first wave of the pandemic.

Methods: Semistructured interviews were conducted with health care providers ($n = 12$) supporting the COVID zone, as well as with patients ($n = 10$) who were discharged from the COVID zone and their family caregivers ($n = 5$). The interviews explored the successes and challenges of working on the unit and the quality of care that was delivered to patients recovering from COVID.

Results: Rapid implementation of the COVID zone was supported by champions at the middle-management level but challenged by a number of factors, including: conflicting expert opinions on best infection control practices (outer setting), limited flow of information from senior leaders to frontline staff (inner setting), lack of rehabilitation equipment and understanding of how to provide high quality rehabilitative care in this context (intervention characteristics), willingness and self-efficacy of staff working in the COVID zone (individual characteristics) and lack of time to reflect on and assess effectiveness (process).

Conclusions: While there was an apparent need for rapid implementation of a COVID rehabilitation zone, senior leadership, middle management and frontline staff faced several challenges. Future evaluations should focus on how to adapt COVID rehabilitation services during fluctuating pandemic restrictions, and to account for rehabilitative needs of people recovering from significant COVID infections.

KEYWORDS

COVID-19, implementation, in-patient rehabilitation, pandemic

1 | INTRODUCTION

Patients recovering from significant COVID-19 infections (COVID) commonly experience long-term physical, cognitive and psychosocial impairments that negatively impact daily functioning and quality of life.[1–3] Therefore, many patients hospitalized with COVID require subsequent in-patient rehabilitation[4–6] to promote recovery, improve health outcomes[7,8] and facilitate community reintegration.[9,10]

Specific aspects of rehabilitative care can be difficult to implement amidst COVID infection control measures.[11] Reduced access to therapy opportunities (limited group therapies or access to therapy equipment), visitor restrictions and physical distancing all necessitate novel implementation strategies to deliver safe and effective rehabilitation during COVID.[10–12] One strategy for facilitating COVID rehabilitation was through the creation of a designated COVID unit with a dedicated team.[5] However, little has been published about the implementation of such units. Therefore, we assessed the rapid implementation of a COVID zone in an in-patient rehabilitation hospital (IRH) at the onset of the pandemic using the Consolidated Framework for Implementation Research (CFIR).[13]

2 | METHODS

This analysis draws on data from a larger qualitative study examining the COVID care pathway.[14] This qualitative evaluation uses the CFIR to explore the barriers and facilitators to implementing a COVID zone.[15–17] CFIR constructs guiding this evaluation included: intervention characteristics, outer setting, inner setting, characteristics of the individual and processes. Our methodology and findings below are reported in accordance with the Consolidated Criteria for Reporting Qualitative Research (COREQ, see Supporting Information: Appendix A).

2.1 | Study setting and intervention

This evaluation was conducted at an IRH located in Toronto, Canada. The hospital offers in-patient and outpatient rehabilitation services to people recovering from a range of illnesses and injuries. The COVID zone was implemented on the Musculoskeletal and Geriatric Rehabilitation Unit. Seven of the units' 39 beds were designated to the COVID zone, with an additional 15 beds available if needed. The unit was staffed by a hospitalist physician, physiatrist, consulting psychiatrist, nurses and allied health professionals. They also had direct support from the Infection Prevention and Control (IPAC) team. The COVID zone provided rehabilitation to a total of 45 patients between March 2020 and July 2021.

2.2 | Data collection

A convenience sample of HCPs working in or supporting the COVID zone were recruited using the hospital's COVID unit listservs (n = 12; see Table 1 for sample characteristics). We also recruited a convenience sample of family caregivers (n = 5) and patients (n = 10) who were discharged from the COVID zone between March and September 2020 (see Table 2 for sample characteristics). All patients were contacted by telephone or email to share information about the study, and each patient was asked for their caregiver's contact details for the research team to follow-up. Eligible patients and caregivers included those who spoke English and were cognitively able to provide consent. Additionally, caregivers were eligible if they were a friend or family member of a patient who was discharged from the COVID unit during the above-mentioned period. Thirteen patients and caregivers were eligible for the study but were not interested (n = 9) or could not be reached (n = 4). One family caregiver (CG10) also worked as a frontline nurse at the IRH, and relevant quotes that pertained to implementation are included in the current analysis.

Data were collected through single, semistructured, one-to-one interviews conducted via Zoom or telephone between August 2020 and February 2021 by a trained research analyst (S. G.) with expertise in qualitative research. The interviewer and the research team were embedded within the IRH; the participants had no prior relationship with the interviewer and understood that the goals were to explore stakeholder experiences with COVID care. Interviews ranged from 30 to 80 min. Questions examining the implementation of the COVID zone

TABLE 1 Health care providers' role and description

Role	Description	N (%)
Occupational therapist (OT)	Uses everyday activities and occupations to treat the physical, mental, developmental and emotional ailments that impact a patient's ability to perform day-to-day tasks	3 (35)
Patient care manager (PCM)	Supervises a clinical team and are responsible for the direction of patient care	2 (17)
Registered nurse (RN)	Assesses, identifies, plans, implements, and evaluates the nursing care required to assist patients in meeting their physical, social, spiritual and psychological needs	2 (17)
Pharmacist	Prepares and dispenses prescription medications and educates patients and families on the safe and effective use of medications	1 (8)
Medical department head (MDH)	Responsible for medical supervision and overseeing daily operations in their respective departments	2 (17)
Professional practice leader (PPL)	Oversees and supervises clinical and professional practice, and develops and supports patient care and education through mentorship, consultation, and acting as a resource for staff	2 (17)

TABLE 2 Demographic information of patients (*n* = 10) and caregivers (*n* = 5)

Characteristic	Patients (*n* = 10)	Caregivers (*n* = 5)
Age in years (mean, SD)	62.78 (17.89)	60.17 (4.28)
Length of stay in rehab in days (mean, SD)	12.44 (1.81)	
Sex		
Male	2 (20%)	2 (40%)
Female	7 (70%)	3 (60%)
Did not disclose	1 (10%)	0
Ethnicity		
Black	1 (10%)	1 (20%)
Chinese	2 (2%)	0
Filipino	2 (20%)	1 (20%)
Indian	1 (10%)	0
South Asian	1 (10%)	0
White	3 (30%)	3 (60%)
Marital status		
Married or common law	3 (30%)	5 (100%)
Widowed	4 (40%)	0
Single	2 (20%)	0
Did not disclose	1 (10%)	0
Education		
Some high school	3 (30%)	0
Completed college or university	6 (60%)	5 (100%)
Graduate programme	1 (10%)	0
Annual income (Canadian Dollars)		
$10,000–$29,999	4 (40%)	0
$30,000–$59,999	2 (20%)	2 (40%)
$60,000+	1 (10%)	2 (40%)
Did not disclose	3 (30%)	1 (20%)

Abbreviation: SD, standard deviation.

focused on successes and challenges working on the unit, supports received, and the quality of care delivered to patients. Data were collected until saturation was reached.[18] All sessions were audio-recorded, transcribed verbatim and uploaded into NVivo for data management and collaborative coding. Ethical approval for this study was granted by Sunnybrook Health Sciences Centre, and informed consent was obtained from all participants before data collection.

2.3 | Data analysis

We used a qualitative descriptive approach to elicit a rich description of the implementation of the COVID zone to inform the development of actionable policy and practice recommendations that were reflective of our participants' views.[19] We conducted a deductive thematic analysis[20] guided by a coding framework based on the CFIR (see Table 3). All transcripts were coded independently and then jointly by two researchers (Z. S. and S. G.), and three additional researchers (C. S., R. S. and M. W.) participated in the thematic analysis. Rigour was established by double coding, keeping audit trails, recording memos and regular team meetings.

3 | RESULTS

Although participants recognized the need for a COVID zone, several implementation challenges were identified. Participants' insights fell into several CFIR constructs that spanned all five domains of the framework (see Table 3).

3.1 | Domain 1: Intervention characteristics (attributes of the intervention that impact implementation success)

Participants recognized that the IRH had to 'move forward and dedicate a zone or unit for COVID-19 patients', (HCP06, PCM), as cohorting was thought to have the advantage of minimizing the risk of disease transmission, conserving personal protective equipment (PPE), and increasing staff competencies. However, the decision of where to establish the COVID zone was made by senior leadership, with little engagement of frontline staff due to urgency. As one participant described, 'we had to get this unit up and running because we had to isolate patients who were already there on our unit. We didn't have time to prepare'. (HPC05, OT)

Patients and family caregivers were 'glad to be given the opportunity' (CG05) to safely participate in rehabilitation, but staff had concerns about the quality and amount of rehabilitation that could be offered within the COVID zone. While this was in part related to various COVID restrictions, there was also a certain level of 'anxiety and conflict within the team that hindered what they were able to deliver'. (HCP03, PPL)

As one health care provider described:

'My concern is that they wouldn't be getting enough rehab […], they would have to be treated in their rooms, they wouldn't have access to all the equipment. They wouldn't be getting all that they should have been getting'. (HCP09, PCM)

3.2 | Domain 2: Outer setting (external influences on the intervention implementation)

Participants discussed external pressure to create a COVID zone, as not all other rehabilitation programmes were accepting COVID patients. This IRH was networked with a large acute-care hospital

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TABLE 3 Participants' insights about the dedicated COVID zone in the IRH categorized by the CFIR domain and construct

CFIR domain	Construct/sub construct	Findings	Example
Intervention	Intervention source: Perception about whether the intervention is externally or internally developed	Participants recognized that the intervention was designed by senior leaders (e.g., IPAC and operations managers) and the manager of the geriatric and musculoskeletal unit.	HCP01, PPL: 'I didn't have a huge part of deciding where things were going to be or what unit it was. That was [senior leadership], my part was more contemplative'.
	Relative advantage: Stakeholders' perception of the advantage of implementing the innovation versus an alternative solution	The COVID zone was recognized as being advantageous from a public health perspective because cohorting patients into a designated space minimizes the risk of infection. For more details on the need to cohort patients, see Tension for Change. Some patients perceived the repercussions of physical isolation to outweigh the advantages of the program.	HCP04, MDH: 'It was realized that this debility is kind of like what we have for the [geriatric and musculoskeletal unit] and that's a program that takes patients with medical debility and deconditioning. We said, "You know what? [COVID-19] is mostly like that" [...] At first they thought, "let's just spread the pain so no one has all the responsibility, everyone shares equally" [...] no, you're much better off putting all the patients on one unit and that's because we can preserve PPE better that way, we don't have to have everyone on every floor doing it, we reduce the potential spread of COVID, and we also develop staff competencies'. PT05: 'The biggest thing is that I had to have the door to my room closed all the time, and I hated it. I felt like I was in jail [...] and they said, well, we have to because of COVID, I said, please don't shut me out, don't do this to me. She goes, well, these are the rules. And I said, I know, but don't close the door on me, I'm alone'.
	Trialability: The ability to test the innovation on a small scale in the organisation	The abruptness of the COVID-19 pandemic and subsequent program implementation meant that there was no opportunity for trialability; the intervention itself was a trial. For more information on abruptness, see Planning.	HCP05, OT: 'We had to get this unit up and running within an hour because we had to isolate these patients who were already there on our unit. We didn't have time to prepare like we thought we would when we knew that they were being transferred from another hospital [...] it all came together very fast'. HCP09, PCM: '[The process] could have gone much better, I think the challenge was that it was fast and furious, it was coming at us really quickly'.

TABLE 3 (Continued)

CFIR domain	Construct/sub construct	Findings	Example
Outer Setting	Patient needs and resources: The extent to which patient needs are accurately known and prioritized by the organisation	Patients expressed a clear need for post-COVID-19 rehabilitation to promote recovery. Clinicians recognized the need to provide rehabilitation in a designated zone to combat debility and promote recovery. Patients, caregivers, and HCP noted the challenges meeting psycho-social needs because of visitor restrictions.	PT18: 'They didn't want to send me home because I couldn't do anything for myself, really. I have to go to rehab so they can help me to walk. I needed to walk'. PT11: 'It's hard for the family and it's hard for [CG] to see me like [this], at my low. And [CG] wants to be involved, and I want her support. […] If you see your family, you feel better'. CG07: 'For her to rebound in rehab, she needed strength in terms of mobility [but] also mental and frame of mind, being positive again'. HCP09, PCM: 'We need to rehab patients, and if the rehab needs to happen, then that's why we're going be bringing them onto this unit'. HCP03, PPL: 'We've been trying to help patients who have been isolated [or] are lonely [but] it is harder because we didn't have the same ability to bring families into the building'.
	Cosmopolitanism: The degree to which an organisation is networked with other external organisations	Participants recognized the role that having an institutional alliance between the acute care and rehabilitation facility plays in streamlining care.	HCP07, OT:'[Acute care hospital] is the mother ship, right, and then you've got other programs like [IRH] underneath it'. HCP12, MDH: 'Once the institution made the decision that they would offer rehabilitation for COVID positive patients, from my perspective, there was nothing different about the process. And fortunately, [IRH] was doing that […] the receiving facility had to be comfortable, which [IRH] was because [acute care hospital] was as well'.
	Peer pressure: Mimetic or competitive pressure to implement an intervention	Since no other rehabilitation centres were accepting patients recovering from COVID-19, there was an inadvertent pressure for to create a designated zone and provide post-COVID-19 rehabilitation.	HCP12, MDH: 'I could say that there was differential buy-in across the system. I can tell you that some of our partners just didn't take COVID patients. And some of our colleagues stepped up to the

(Continues)

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TABLE 3 (Continued)

CFIR domain	Construct/sub construct	Findings	Example
			plate and sent COVID positive patients to rehab, like [IRH]'.
Inner Setting	Networks and communications: The nature and quality of webs of social networks and the nature and quality of formal and informal communications within an organisation	Participants were not satisfied with the nature and quality of communication coming from senior leadership but recognized information sharing was limited due to the ambiguity and rapidly evolving nature of the pandemic.	HCP09, PCM:'I think there were a lot of [communication] gaps that were identified, but I think we did the best given the information we were given from [senior leaders] [...] my staff, I know they thought it wasn't very clear and concise'.
		Frontline participants reported positive and supportive dynamics and social networks amongst each other.	HCP07, OT: 'I think people really pulled together and collaborated and really supported each other in so many different ways. That's what I think the strength of this team is'.
	Implementation climate		
	Tension for change: The degree to which stakeholders perceive the current situation as intolerable or needing change	Participants strongly endorsed a need to have a designated zone to provide post-COVID-19 rehabilitation. Without a cohorted zone, the risk of transmission increases (see Relative Advantage) and patients would not get care (see Peer Pressure).	HCP09, PCM: 'We then determined that we would have a dedicated crew, dedicated staff to work with these folks [...] I think that we're here because we need to rehab patients and if the rehab needs to happen then that's why we're going be bringing them onto this unit'.
	Compatibility: The degree of tangible fit between meaning and values attached to the intervention by involved individuals, and how the intervention fits with existing workflows and systems	Participants felt the location of the COVID-19 zone did not easily fit into the existing workflow.	HCP06, PCM:'When we were thinking of [the geriatric and musculoskeletal unit], it was questions like "why the penthouse unit when it could be on another lower level", which does make a lot more sense as well, from a flow and access into the building and minimizing patient transport [...] right now, whenever a patient comes to the [upper level], we have to make sure we coordinate it with our screening team, our environmental surfaces team. We have to ensure that the elevators are wiped down when the patient enters [...] But if it was on the main level, it would just minimize some of that movement and some of that work'.
		Despite their expertise working with geriatrics and musculoskeletal populations, participants reported that the original staff delivering the intervention may not have been the most ideal fit.	HCP03, PPL:'That particular team was already really struggling as a team, in terms of their team dynamics and their team processes [...] When you're in a crisis, it's not the best time

TABLE 3 (Continued)

CFIR domain	Construct/sub construct	Findings	Example
			to step back and take time out of your busy day to talk about team dynamics and so forth. That really should have been done in preparation. Which is, again, why I feel, fairly strongly, that team was not the best team to land a COVID unit on. We know that when teams are in crisis, that's when all of those sorts of conflict and communication problems and errors become enhanced'.
	Organisational incentives and rewards: Extrinsic incentives such as goal-sharing awards, performance reviews, promotions, and raises in salary, and less tangible incentives such as increased stature or respect	Participants reported an absence of tangible incentives and rewards from the organisation. In this absence, patients assumed a new responsibility of providing staff with less tangible incentives and rewards such as praise.	HCP10, OT: 'People in ICU are getting all these free meals [...] I'm working with a COVID patient every freaking day. [...] Not being recognized as much as other people were being recognized, by the organisation at large. That hurt'.
			PT06: 'I have very big respect. I even called back once or twice in the last couple of months to see how they were doing [...] [HCP08] told me we got your thank-you letter [...] she said they put it in a frame and they put it on one of the walls of the rehab in that area. Because it was compliments to the nurses and the staff there'.
	Learning climate: A climate in which leaders express their own fallibility and need for team members' assistance and input, and team members feel that they are essential, valued, and knowledgeable partners in the change process	Participants described a learning environment whereby leaders did not express fallibility, nor consult with clinical staff for input or assistance. Overall, frontline staff did not feel valued or involved partners in the change process.	HCP03, PPL: 'I wasn't involved. That was disappointing for me because I am part of the leadership team, but unfortunately some decisions are made at an operational level, and they don't always take into account the impact on professional practice [...] [Senior leaders] didn't seem like they were wanting to hear what staff have to say because there's perhaps some fear that we can't accommodate what they want in the future. But if we don't give them an opportunity to express what this experience was like for them, it's not going to be effective the next time'.
	Readiness for implementation leadership engagement: Commitment, involvement, and accountability of leaders and managers with the implementation	Participants described that senior leadership was largely responsible for creating the intervention (see Intervention Source for more details).	HCP04, MDH: 'When all this was happening, initially I was working from home, and then I said, "You know, I've really got to be at [IRH]" so I would go

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TABLE 3 (Continued)

CFIR domain	Construct/sub construct	Findings	Example
		Once senior leaders began having more of a physical presence in the IRH, participants perceived a higher degree of commitment, involvement, and accountability with the implementation.	maybe three times a week up to each floor and just say, "Hey, how's it going?" and try to assess the readiness, assess the morale of the staff, just interact with everyone, just so they felt like their leaders were there and present and behind them'.
			HCP03, PPL: 'People who are in levels of decision making where policies are made, there isn't there actual physical presence in the building. Once we actually had them come to the building and actually sit down with the staff and have an actual discussion, rather than an email or a snapshot announcement or a prerecorded town hall discussion. Where there was actually an opportunity to have dialogue and see people face to face and build that trust. That, to me was a turning point'.
	Available resources: The level of resources dedicated for implementation and on-going operations, including money, training, education, physical space, and time	There was a lack of available resources, including rehabilitation equipment, a lack of PPE to ensure staff felt safe, and a lack of psychological and social supports for both patients and staff.	HCP06, PCM: 'If you don't have the resources to do the job it makes it very difficult [...] You need to be able to have access to a gym, and so on and so forth. And we didn't have a lot of access to all of that, because they were just contained in the zone [...] and so you question, what is the therapy that is being provided if you don't have access to other equipment'?
		Participants described how the absence of these resources made carrying out the intervention difficult.	HCP02, pharmacist: 'There were some problem acquiring the good masks, the N95s. We never got those'.
			HCP03, PPL: 'We've had a lot of challenges with having adequate access to psycho-social supports and psychological supports'.
	Access to knowledge and information: Ease of access to digestible information and knowledge about the intervention and how to incorporate it into work tasks	Participants described receiving information regarding PPE and safety measures, some of which was conflicting and confusing. Participants did not describe receiving information about the intervention, the success of the intervention, or how to	HCP02, pharmacist: 'We were provided information about masks and N95s, the proper donning and doffing of the PPEs, how many patients and staff were positive, so there was a lot of education that way'.

TABLE 3 (Continued)

CFIR domain	Construct/sub construct	Findings	Example
		incorporate the intervention into work tasks.	HCP07, OT: 'We weren't really informed [...] I heard [about the COVID zone] through the grapevine and then I heard it again through meetings. And then suddenly it was here you are, you're going to be getting the patients. But the reality was there was a lot of misinformation'.
Individuals	Knowledge and beliefs about the intervention: Individuals' familiarity with facts, truths, and principles related to the intervention	Participants were relatively knowledgeable that post-COVID-19 rehabilitation was intended to combat deconditioning and debility, and described the therapeutic strategies to do so. However, participants also acknowledged that psychosocial interventions are also needed for post-COVID-19 rehabilitation.	HCP05, OT: 'A lot of [the patients] were just very deconditioned during that time. They were really fatigued [...] they needed lots of help to even just relearn how to walk because of their deconditioning'. HCP03, PPL: 'I think there's a huge role for rehab. Not only from the physical aspect of recovering from COVID, but also the mental, the psycho-social aspect of recovering from COVID. We know there are impairments in those areas for many of our patients who were hospitalized, in acute care, for a long period of time'.
	Self-efficacy: Individual belief in their own capabilities to execute courses of action to achieve implementation goals	Senior leadership perceived frontline staff to be capable and competent to provide care and achieve implementation goals. Participants rarely talked about their own personal belief in their capabilities and skills needed to provide post-COVID-19 rehabilitation.	HCP04, MDH: 'We also develop staff competencies [so] they get really good at treating these patients and they do it every day, whereas if you have a whole bunch of staff from all the units doing a little bit, you don't develop the same competency [...] Once they got used to it, once they learned the competencies, once they learned how to deal with the PPE with the patients, [...] In my sense, they were okay'. HCP08, RN: 'I did it with the thought that, well, if I'm going to do this, I'm going to do it as best as we possibly can. And I trust myself [...] I have a lot of years of experience'.
	Individual state of change: Characterisation of the phase an individual is in, as he or she progresses toward skilled, enthusiastic, and sustained use of the intervention	Participants recognized the array of states of change, ranging from unenthusiastic to eager to participate in implementation.	HCP01, PPL: 'There's three types of people. There's the people who will go in, running, I don't care, I feel fine, I feel protected, I will go see whoever I need to see. There's the group of people who, with

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TABLE 3 (Continued)

CFIR domain	Construct/sub construct	Findings	Example
			a lot of education, would eventually feel comfortable. Then there's a Group of people who, no matter what you tell them, are never going to be comfortable'.
			HCP07, OT: '[It's] on a spectrum. Myself, I fell somewhere in the middle. Did I really want to do it? No, I didn't really want to do it. But I didn't really not want to do it either'.
	Other personal attributes: A broad construct to include other personal traits such as tolerance of ambiguity, intellectual ability, motivation, values, competence, capacity, and learning style	Participants described the intrapersonal and external factors that influenced their abilities to participate in the intervention, including personal health conditions, family structure and caregiving responsibilities, and previous experiences with COVID.	CG10, RN: 'Because of what happened [caring for PT11], the more passion that I have to take care of those who have COVID […] I can give them more care because I know how it feels for them to be isolated'.
		Participants sought out learning opportunities to enhance their coping strategies and other personal attributes.	HCP02, pharmacist: 'When we were working [in the unit], the staff did need to sacrifice […] There were things I wasn't willing to give up. Sleeping next to my husband, I wasn't willing to give up. Separating from my family, again I wasn't willing to give up'.
			HCP07, OT: 'There was a course at [university] about resilience in time of COVID-19. And that really helped me because it talked about ways that would reassure me, taught me coping strategies, emotional regulation, things like that'.
Process	Planning: The degree to which the tasks for implementation are developed in advance	Participants described the lack of planning that went into implementing the intervention. For more details on the abruptness of implementation, see Trialability	HCP09, PCM: 'Had we, sort of, planned much quicker in advance, you know, if we get a COVID patient, what it is going to look like, what's the process going to be, I think it could have gone much smoother'.
	Engaging: Attracting and involving appropriate individuals in the implementation and use of the intervention	With the intervention being predominately created by senior leadership, middle management and frontline workers described feeling uninvolved in the design of the intervention.	HCP03, PPL:'What I often see is that decisions are made solely at an operational level. They take into account how things are implemented operationally, and they take into account the perspectives of the operational managers, directors and so forth. But they don't always take into account the impact on
		Middle management described engaging frontline clinicians in terms of operationalizing and figuring out the logistics of	

TABLE 3 (Continued)

CFIR domain	Construct/sub construct	Findings	Example
		implementation, leading to a sense of increased engagement.	professional practice, so the clinicians for example'.
		Family caregivers were recognized as key individuals that are normally involved with program delivery, but were excluded due to visitation policies.	HCP06, PCM: '[Clinicians] were engaged in deciding okay, who is going to go in? [...] we did have a conversation that if there are no volunteers, then I have to assign, but it never came to that'.
			HCP01, PPL: 'Normally, a family member could be in and you could talk with the patient and the family member together, show them different things that they'd need at home, physio exercises. But we weren't allowing visitors'.
	Champions: 'Individuals who dedicate themselves to supporting, marketing, and "driving through" an [implementation]' overcoming indifference or resistance that the intervention may provoke in an organisation	Champions emerged through COVID huddles, whereby middle management empowered and reassured staff who were facilitating the intervention.	HCP02, Pharmacist: 'There were a lot of huddles with the managers, answering questions, requests, concerns, from the staff [...] they were pretty responsive. Helpful'.
			CG10, RN: 'I have to give credit to my manager because [...] she would always say that she will be there and seeing us. And she was. We had questions, she tried to answer them as best as she could [...] we were all anxious to work in the unit, but she reassured us. We did our huddles, we vented, we got our concerns out'.
	External change agents reflecting and evaluating: Quantitative and qualitative feedback about the progress, quality, and experience of implementation.	Participants reported a lack of feedback regarding the progress and quality of implementation.	HCP03, PPL: 'We don't have, from what I understand, any documentation that we could even share about what went well in [the COVID zone] [and] what didn't'.

Abbreviations: CFIR, Consolidated Framework for Implementation Research; IPAC, Infection Prevention and Control; IRH, in-patient rehabilitation hospital.

and this institutional partnership was thought to provide a clear path for patients from acute care to rehabilitation.

Political directives and external mandates also impacted implementation. For instance, the lack of government-instituted 'pandemic pay' for allied health professionals created friction within the COVID zone, and participants were frustrated that 'none of us who were working face-to-face with the COVID patients, except for nurses, got pandemic pay'. (HCP05, OT) Another challenge was linked to the fact that professional associations were providing members with their own best practice guidelines for working in healthcare settings during the pandemic that conflicted with

both those of the provincial government and the local hospital's IPAC team.

As explained by one health care provider:

'There was a document circulated by our [physiotherapy] and [occupational therapy] associations to say what needed airborne precautions and we needed droplet precautions [...] We were not supplied with N95 because our infection control practitioners were saying, no, everything is droplet and only certain things were airborne. Who would I believe'? (HCP01, PPL)

Participants expressed frustration at 'these two different view-points coming from two different experts', (HCP03, PPL); the lack of compatibility between external recommendations and internal

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policies left them questioning whether 'the experts in the hospital were really looking out for the best needs of the clinicians [...] by not providing them with every piece of personal protective equipment that [clinicians] felt was needed'. (HCP03, PPL)

3.3 | Domain 3: Inner setting (characteristics of the implementing organisation)

At the onset of the pandemic, a strong tension for change emerged, as the facility 'couldn't have these patients spread out anymore, because staff were concerned about risk of transmission [...] of staff getting infected, [and] for other patients getting infected'. (HCP06, PCM) However, frontline staff raised concerns about the compatibility of the unit that was selected to house the COVID zone. Participants felt that the zone's location on the upper-most level of the IRH disrupted workflow and required additional coordination to transport patients from the hospital entrance. Others commented that while the unit's original staff had expertise in caring for deconditioned patients, their team dynamics were still developing and thus were not optimally positioned to deliver the intervention. As one participant described, 'it would have made sense to look at a variety of factors [...] not solely the population that [the COVID zone] was going to serve. [The unit] didn't have the capacity'. (HCP03, PPL)

Senior leadership was predominantly responsible for initiating the implementation of the COVID zone, leaving some frontline staff feeling that they could have been better engaged. Although management staff implemented 'COVID huddles' to provide COVID-related updates, senior leadership was perceived as largely inaccessible, especially at the onset of the pandemic where information was shared primarily through town halls and email. As the pandemic progressed, senior leadership was more present on the frontline, which staff felt showed a greater commitment and accountability to the COVID zone and the wellbeing of its staff.

Provision of rehabilitation was strained by a lack of resources (e.g., PPE shortages) and inaccessible rehabilitation equipment (e.g., gym). Conversely, rehabilitation was facilitated by the extra time that HCPs had with patients, which was necessary, as rehabilitation took longer to deliver and patients had more complex psychosocial needs due to visitor restrictions.

As one health care provider reflected:

'On the COVID unit, I would spend an hour with each of my patients. [...] normally, I'm in and out of a patient's room every 15–20 minutes. [But] this was some of the most healthy nursing I've done in years. It meant that I could spend [time] working through some of the things they were concerned about'. (HCP08, RN)

3.4 | Domain 4: Characteristics of individuals (characteristics of the implementing individuals)

HCPs recognized the importance of rehabilitation for COVID patients; however, frontline staff varied in how comfortable and eager they were

to participate in the intervention. Many felt 'forced' and discussed how they 'were put in a position where we don't know a lot, but we're having to make decisions and deal with it. [...] It wasn't a choice'. (HCP07, OT)

Although senior leadership hoped that 'develop[ing] staff competencies [so] they get really good at treating these patients' (HCP04, MDH) would foster self-efficacy, frontline staff felt 'unsure of what I was supposed to do [because] no one was telling me anything'. (HCP02, pharmacist) Others lacked knowledge of specific rehabilitation strategies to address the complex needs of COVID patients and discussed how they were required to think of creative solutions in an environment where usual resources (e.g., rehabilitation equipment) were unavailable. Willingness to work in the COVID zone was further influenced by personal circumstances, including prior experience caring for a loved one with COVID, childcare and caregiving responsibilities, and personal health risks. For some, however, interest working in the COVID zone increased as the pandemic progressed:

'When we first started, everybody was afraid [...] by the beginning of the second month, we had nurses volunteering because they saw it as an easier rotation. [...] It was almost like we painted the fence white, and everybody wanted to start painting the picket fence'. (HCP08, RN)

3.5 | Domain 5: Process (stages of implementation)

Participants explained that the abrupt onset of the pandemic and the rapid influx of COVID patients created little time for comprehensive planning. As one participant described, 'once it was decided that [unit] would have the COVID zone [...] they only had a couple of days to figure it out [and] jump into action'. (HCP01, PPL) Due to the lack of opportunity for planning, there were no mechanisms in place for formal evaluation and participants questioned, 'Did we do it right? Did we do it wrong? Nobody told us'. (HCP07, OT)

Since working on the COVID zone was initially perceived as 'not cool' (HCP07, OT), management had to champion the intervention among frontline staff to overcome some resistance. Frontline staff who were resistant wanted to be more involved in implementation decision making and to be more 'connected to [senior leadership] to feel they can trust them' (HCP03, PPL).

The exclusion of family caregivers further exacerbated implementation, as caregivers usually work with staff to facilitate discharge planning and support psychosocial outcomes.

As expained by one health care provider:

'We didn't have the same ability to bring families into the building to teach them, to show them things, to work with them. [...] We didn't [have the capacity] to be able to be effective with all those aspects of care'. (HCP03, PPL)

4 | DISCUSSION

At the onset of the pandemic, rehabilitation institutes across the globe struggled to provide care to patients recovering from significant COVID infections.[21] While emerging research has

explored rehabilitative outcomes for these patients,[7,22–25] this is the first study to examine the challenges of rapidly implementing a COVID rehabilitation strategy in an IRH.[13] Senior leadership was under pressure, as few other rehabilitation institutes in the region were willing to accept COVID patients, and tensions around the need to cohort necessitated the implementation of a COVID zone.

In the current study, senior leadership had limited opportunity to gauge organisational readiness and engage stakeholders. While these are key steps for the implementation of health care innovations,[13,26–29] crisis conditions, like those observed in the pandemic, made it difficult to engage in collaborative decision-making.[30] As a result, staff questioned the physical location of the COVID zone and had concerns about the capacity of the team to work successfully in such challenging conditions. Like other COVID implementation studies,[17] champions were critical for overcoming this resistance. In the current study, this role was carried out by middle management who shared information, addressed staff concerns and boosted team morale.

Despite the support provided by middle management, implementation was still strained by several factors. These included: conflicting opinions on best IPAC practices (outer setting), limited flow of information from senior leaders to frontline staff (inner setting), reduced access to rehabilitation equipment and understanding of how to provide high quality rehabilitative care in this context (intervention characteristics), willingness and self-efficacy among frontline staff (individual characteristics), lack of opportunity to trial the intervention on a small scale and reverse or change course if warranted (intervention characteristics); and lack of time to reflect on and assess effectiveness (process). While these barriers are similar to those discussed in other studies implementing health interventions during COVID,[15,31–33] this was the first study to explore these challenges in a rehabilitation context and adds to the growing literature exploring rehabilitation in COVID care.

Our findings point to several recommendations for future COVID zones: first, information sharing from senior leadership must be prioritized to reduce the 'unknown' and combat conflicting messaging. At the onset of the pandemic, emerging research evidence, government regulations, public health recommendations, clinical guidelines and media messaging were changing rapidly.[30] This negatively impacted implementation by creating confusion and misinformation among staff. Therefore, strategies to communicate with staff across all units of the hospital will be critical to ensure that those supporting patients recovering from COVID are kept up-to-date on emerging information related to the pandemic, COVID infectivity, and best rehabilitation practices for this population.

Secondly, efforts must be made to promote staff competencies providing care to this population. While our data did not explore the nature and extent of rehabilitation provided, it was clear that the pandemic created a nebulous and unfamiliar environment that generated feelings of uncertainty as to the best way to provide rehabilitation to patients recovering from COVID. Therefore, more research is needed to understand if and how patients recovering from significant COVID infections require a more nuanced rehabilitation

approach, and how best to deliver this in situations where usual resources (e.g., rehabilitation gym) are restricted due to ongoing outbreaks.[11]

Given ongoing restrictions to community-based rehabilitation services, staff may also require supports to train patients to self-manage recovery at home.[25] As the pandemic progresses, staff will also need to become competent providing care to patients with long COVID; while this population experiences a wide range of persistent health challenges that benefit from rehabilitation[1,34] they are frequently dismissed by HCPs,[35,36] highlighting the need to build skills among staff to recognize and support long COVID symptoms.

Third, our findings suggest that implementation of a COVID zone would be strengthened through greater incorporation of the needs of patients and their family caregivers. Although patients in the current study were grateful to have opportunities for rehabilitation, many felt that the physical isolation outweighed the advantages of the programme. Furthermore, the exclusion of family caregivers from the rehabilitation environment strained implementation, as families usually play a key role in promoting psychosocial health outcomes.[37,38] These findings support recommendations from Safaeinili and colleagues[39] to expand the CFIR to include 'patient needs and resources' as its own domain. This would provide a richer understanding of implementation processes and reinforce the importance of patient and family-centred care when designing, implementing and evaluating novel health interventions.[39,40]

5 | STRENGTHS AND LIMITATIONS

The major strength of this study was the ability to rapidly evaluate the implementation of a COVID zone at the onset of the pandemic, using a robust theoretical framework.[13] Importantly, our findings add to the growing body of literature exploring the challenges implementing health interventions during a crisis like the COVID pandemic.[15–17,30–32] However, this study did not explore the implementation of specific rehabilitation therapies for patients recovering from COVID and additional research is needed to understand both the types of therapies and how best to implement them in this adapted context for patients recovering from acute infections as well as long COVID.[1,8,10,41–43]

The COVID zone was adapted in July 2021 once it was understood that cohorting patients recovering from COVID was no longer needed. While changes in IPAC measures will address some implementation barriers identified in the current study (e.g., increased access to equipment and reintroduction of family caregivers into the hospital setting), others (such as access to information and staff self-efficacy) will require additional considerations. As the pandemic progresses and emerging viral variants create new 'unknowns' that amplify crisis circumstances or lead to outbreaks on units within the facility, our findings offer valuable insights to ensure that rehabilitation services can continue.

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6 | CONCLUSION

While there was the need for rapid implementation of a COVID-19 rehabilitation zone, several barriers were faced by senior leadership, middle management and frontline staff. These barriers were most predominately associated with the inner setting and personal characteristics. Future evaluations should focus on how to adapt COVID rehabilitation services during fluctuating pandemic restrictions.

AUTHOR CONTRIBUTIONS

Christine L. Sheppard contributed to the study design and led the data analysis and interpretation of results, manuscript writing and incorporating coauthor feedback. Zara Szigeti contributed to data analysis and interpretation of results, manuscript preparation, revisions and feedback. Robert Simpson contributed to data analysis and interpretation of results, and manuscript revisions and feedback. Jacqueline Minezes, Sander L. Hitzig, Amanda Mayo, Lawrence R. Robinson and Maria Lung contributed to the study design and provided manuscript revisions and feedback. Marina B. Wasilewski designed and directed the study. She was responsible for funding acquisition, contributed to the analysis of the results, and provided manuscript revisions and feedback. All authors reviewed the results and approved the final version of the manuscript.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The research data are not shared.

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