



## Research

## Intensive care unit clinicians identify many barriers to, and facilitators of, early mobilisation: a qualitative study using the Theoretical Domains Framework

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## KEY WORDS

Early mobilisation  
Barriers  
Facilitators  
Theoretical domain framework  
Intensive care unit

## ABSTRACT

**Question:** From the perspective of intensive care unit (ICU) clinicians, what are the barriers to and facilitators of implementing early mobilisation? **Design:** A qualitative study using focus groups, with analysis using the Theoretical Domains Framework. **Participants:** Physicians, nurses, respiratory therapists and physiotherapists from the ICUs of three university-affiliated hospitals in Montreal, Canada. **Methods:** Four focus group meetings were conducted with 33 participating ICU clinicians. Two researchers independently performed thematic content analysis on verbatim transcriptions of the audio recordings using the Theoretical Domains Framework. **Results:** Data saturation was reached after the third focus group. Thirty-six barriers were categorised in 13 domains of the Theoretical Domains Framework. The key barriers to early mobilisation were: lack of conviction and knowledge regarding the available evidence about early mobilisation; lack of attention to the provision of optimal care; poor communication; the unpredictable nature of the ICU; and limited staffing, equipment, time and clinical knowledge. Twenty-five facilitators categorised in ten TDF domains were also identified. These included individual-level facilitators (intrinsic motivation, positive outcome expectations, conscious effort to mobilise early, good planning/coordination, the presence of ICU champions, and expert support by a physiotherapist) and organisational-level facilitators (reminder system, pro-early mobilisation culture, implementation of an early mobilisation protocol, and improved ICU organisation). **Conclusions:** A broad array of barriers to and facilitators of early mobilisation in the ICU were identified in this study. Clinicians can consider whether these barriers and facilitators are operating in their ICU. These may inform the design of tailored knowledge translation interventions to promote early mobilisation in the ICU. [Anekwe DE, Milner SC, Bussi eres A, de Marchie M, Spahija J (2020) Intensive care unit clinicians identify many barriers to, and facilitators of, early mobilisation: a qualitative study using the Theoretical Domains Framework. *Journal of Physiotherapy* ■:■–■]

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### Introduction

Patients discharged from an intensive care unit (ICU) are prone to impairments in body structure and function,<sup>1,2</sup> limitations in functional activities<sup>1,2</sup> and participation restrictions,<sup>1</sup> even after the primary pathology that led to ICU admission has resolved.<sup>3</sup> These impairments, limitations and restrictions may be the result of a number of complex interrelated factors involving reduced mobility, which commonly occurs in patients hospitalised in an ICU.<sup>3–5</sup> Early mobilisation – defined as initiating activities within 24 to 48 hours after ICU admission<sup>6</sup> – has been advocated as a strategy to combat the effects of reduced mobility in the ICU.<sup>6</sup> There is an increasing body of evidence indicating that early mobilisation is safe and feasible, and potentially ameliorates impairments, limitations and restrictions.<sup>7–9</sup> However, as in all areas of clinical practice, translating this evidence into practice is problematic.<sup>4,5</sup>

Most studies that have attempted to identify the barriers and facilitators of implementing early mobilisation<sup>10–16</sup> have used

surveys.<sup>10,11,14–16</sup> Unfortunately, surveys often fail to adequately explore the reasons behind the responses that are given.<sup>17</sup> Focus groups are often used to trace the cognitive and social processes that influence survey responses and deepen the understanding of complex problems. They can add a human dimension to impersonal data from surveys.<sup>17–19</sup> Qualitative data is therefore an important complement to quantitative data to inform the design of a knowledge-translation intervention.<sup>18,20</sup>

Theory-based approaches can inform the development of interview topics, guide data analysis, and provide an understanding of the underpinning behaviours.<sup>21,22</sup> The Theoretical Domains Framework (TDF) consists of 33 psychological theories and 128 theoretical constructs designed for use in studying the implementation of evidence-based practice and the development of strategies for the effective implementation of this practice.<sup>23,24</sup> The revised validated version of the TDF has 14 domains.<sup>24</sup> Using the TDF reduces the risk of omitting important factors that may impact decision-making regarding the use of evidence-based care in clinical practice.<sup>25</sup>

This qualitative study is a follow-up of a previous quantitative survey conducted by this team.<sup>10</sup> The initial survey aimed to identify perceived gaps in the clinical practice of early mobilisation, as well as the barriers and facilitators of early mobilisation in critically ill patients.

The aim of the present study was to deepen understanding of the barriers to the practice of early mobilisation in the ICU from the perspective of ICU clinicians: why these barriers exist, what could be done to ameliorate them, and the facilitators that might enhance the practice of early mobilisation.

Therefore the study question for this qualitative study was:

From the perspective of ICU clinicians, what are the barriers and facilitators of implementing early mobilisation?

## Methods

### Design

Three focus group meetings were conducted with nurses, respiratory therapists and physiotherapists from three McGill University-affiliated teaching hospitals. Heterogeneous groups were chosen to capitalise on the interactive nature of focus groups and the variations in professional perspectives. A fourth focus group was conducted, consisting solely of physicians to avoid hierarchical inhibition of the opinions of other ICU professionals.<sup>26,27</sup>

### Participants

Participants were licensed ICU clinicians working in participating hospitals, with at least 6 months experience in ICU. All had participated in the related survey study.<sup>10</sup>

### Data collection

All survey respondents were targeted for recruitment via a cover letter included with the survey questionnaire. All clinicians who responded to the invitation were included in one of four focus groups consisting of about six to ten participants, each lasting about 60 minutes.<sup>28</sup> To ensure homogeneity in the conduct of the focus groups, the same researcher (DA) who had no prior knowledge of the participants facilitated all the meetings. The focus group topic guide, which was developed by the research team, contained ten semi-structured, open-ended questions (Appendix 1). All focus group meetings were conducted in English, although participants were allowed to express themselves in French. Meetings were audio recorded, and two investigators (DA and JS) took notes during the discussions.

### Data analysis

Verbatim transcriptions of audio recordings were anonymised and imported into software<sup>a</sup> for coding and analysis.<sup>29</sup> Coding was performed independently by two of the investigators (DA and SM) and disagreements were formally resolved at each step by discussion and in consultation with two other investigators (JS and AB) with expertise in critical care and the TDF framework, respectively.

Qualitative content analysis<sup>30</sup> was performed by concurrently classifying quotes into the relevant TDF domains, and then creating specific statements (ie, barriers or facilitators) summarising similar quotes under corresponding domains. The naming of the barriers and facilitators was guided by the theoretical constructs associated with each domain of the TDF.<sup>23,24</sup> Further, items that did not fit into any of the TDF domains were coded and put into a separate category. Items coded into this 'Others' category were reviewed by a third author (AB) with expertise in 'conventional' qualitative analysis and the TDF framework.

Several steps were taken to ensure trustworthiness and rigour of the analysis. First, one of the two researchers (SM) who analysed the transcript was not involved in conducting the focus groups. Second, two researchers (DA and SM) independently verified the audio

transcription scripts and resolved any differences by referring to two other investigators (JS and AB) if needed. Third, line-by-line analysis was performed independently and simultaneously by two researchers (DA and SM). Fourth, one of the reviewers (DA) read all the scripts again after the analysis, reviewed all codings, summarised the findings and crosschecked them with the second reviewer (SM). Finally, the final results were also reviewed by both JS and AB.

Given that a number of criteria may influence the choice of key barriers and facilitators, a multiple-criteria decision method was used – the Pugh matrix – to reflect the relative importance of identified barriers and facilitators.<sup>31,32</sup> Guided by the seven-step process defined by Cervone,<sup>33</sup> three criteria used in previous TDF studies – frequency of quotes, the divergence of opinion and perceived impact<sup>25,34</sup> – were chosen to compare the barriers and then the facilitators in two separate processes. A matrix table was created for the barriers and another for the facilitators, with a weight of two assigned to each criterion. Each barrier or facilitator was then rated on each criterion to generate the scores and the criteria scores were computed to determine the aggregate weight for each barrier or facilitator. 'Frequency of quotes' was based on items judged as 'independent quotes', implying that items were counted each time they occurred independently. Two investigators were involved in this process.

To assess whether or not data saturation had been achieved, concurrent preliminary analysis of data was performed by a single investigator.<sup>35</sup> Barriers and facilitators started recurring after the first focus group, and no new factors emerged after the third focus group, indicating that data saturation had been achieved; nonetheless, the fourth focus group provided deeper insight into some reoccurring themes.

## Results

### Focus groups and participants

Thirty-three practising ICU clinicians took part in the four focus group meetings: 18 nurses, six physiotherapists, three respiratory therapists and six physicians.

### Barriers and facilitators

A total of 36 barriers and 25 facilitators were identified from the focus group discussions (Table 1). The 36 barriers encompassed 388 independent quotes and reflected 13 domains of the validated version of the TDF.<sup>24</sup> The 25 facilitators encompassed 237 independent quotes and reflected ten domains of the validated version of the TDF.<sup>24</sup> Figures 1 and 2 show the aggregate weight of each barrier and facilitator in the Pugh matrix. Barriers and facilitators were reported with an aggregate weight  $\geq 4.5$  in the present study (this threshold was determined a priori as a cutoff to report based on the resultant score of the Cervone process).<sup>33</sup>

### Key barriers and their associated TDF domains

The barriers and their associated domains, as well as illustrative quotes, are reported below. Quotes are identified by the type of focus group: physicians' focus group (PFG) or one of the three multidisciplinary focus group (MDFG).

### Environmental context and resources domain

Key barriers in this domain included limited staffing, lack of time, limited equipment for early mobilisation, poor communication among care providers and the unpredictable nature of the ICU environment.

#### Limited staffing

The limited number of physiotherapists, orderlies, nurses and respiratory therapists was reported as a barrier to early mobilisation.

**Table 1**  
Identified barriers and facilitators in the various domains of the TDF.

Item	Domain (definition)	Barrier	N	Facilitator (presence or availability of)	N
1	Knowledge <i>An awareness of the existence of something</i>	Limited clinical knowledge	17	Clinical knowledge	19
2		Limited procedural knowledge	8	Procedural knowledge	10
3	Skills <i>An ability or proficiency acquired through practice</i>	Limited clinical and organisational skill	9	Clinical and organisational skill	10
4	Social and professional role and identity <i>A coherent set of behaviours and displayed personal qualities of an individual in a social or work setting</i>	Lack of teamwork	3	Teamwork	10
5		Unclear professional roles and responsibilities	13	Clear professional roles and responsibilities	5
6		Negative professional identity ( <i>professional self-concept attributes that hinder EM</i> )	2	Positive professional identity ( <i>professional self-concept attributes that promote EM</i> )	1
7		Beliefs about capabilities <i>Acceptance of the truth, reality or validity about an ability, talent or facility that a person can put to constructive use</i>	Low professional confidence	2	
8	Optimism <i>The confidence that things will happen for the best or that desired goals will be attained</i>	Lack of optimism	4	Optimism	4
9	Belief about consequences <i>Acceptance of truth, reality, or validity about outcomes of a behaviour in a given situation</i>	Negative outcome expectations	4	Positive outcome expectations	12
10		Occupational risk	8		
11		Lack of evidence/data/conviction	16	Evidence/data	8
12	Intentions <i>A conscious decision to perform a behaviour or a resolve to act in a certain way</i>	Low intrinsic motivation	18	Intrinsic motivation	28
13		Lack of conscious effort	5	Conscious effort	10
14	Goals <i>Mental representations of outcomes or end states that an individual wants to achieve</i>	Low prioritisation	8		
15	Memory, attention and decision processes <i>The ability to retain information, focus selectively on aspects of the environment and choose between two or more alternatives</i>	No reminders	2	Reminders	10
16		Lack of attention to the provision of optimal care	18	Attention to the provision of optimal care	7
17		Obesity <sup>a</sup>	11		
18		Medical instability <sup>a</sup>	18		
19		Sedation <sup>a</sup>	9		
20		Lack of patient comfort or cooperation <sup>a</sup>	10		
21	Environmental context and resources <i>Any circumstance of a person's situation or environment that discourages or encourages the development of skills and abilities, independence, social competence and adaptive behaviour</i>	Limited staffing	41	More staffing	7
22		Unpredictable nature of the ICU	14		
23		Lack of time	24		
24		Limited equipment	27	More equipment	6
25		Limited space	2		
26		Poor communication	14	Improved communication	8
27		Cost	1		
28		No EM culture	3	Pro-EM culture	13
29		Poor ICU organisation	13	Improved ICU organisation	13
30		Doctor's order requirement	8	No doctor's order requirement	4
31	Social influences <i>Those interpersonal processes that can cause individuals to change their thoughts, feelings or behaviours</i>	Cumbersome ICU lines and leads	6		
32		Lack of protocol/guideline implementation	9	Protocol/guideline implementation	9
33		No promotion or support or champion	8	Expert support	13
34				Influence of champions	12
35			Peer modelling	5	
36			Peer support	8	

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**Table 1** (Continued)

Item	Domain (definition)	Barrier	N	Facilitator (presence or availability of)	N
37	Emotion	Stress and burnout	13		
38	A complex reaction pattern, involving experiential, behavioural and physiological elements by which the individual attempts to deal with a personally significant matter or event	Fear	7		
39	Behavioural regulation Anything aimed at managing or changing objectively observed or measured actions	Poor action planning and coordination	13	Good action planning and coordination	9

EM = early mobilisation, ICU = intensive care unit.

<sup>a</sup> These patient-related attributes reflect the 'complexity of cases/patient' that influence clinical decision-making.

... one physiotherapist, running around the room and dealing with chest regular standard stuff and is not available to do more time-consuming mobilisations. (PFG)

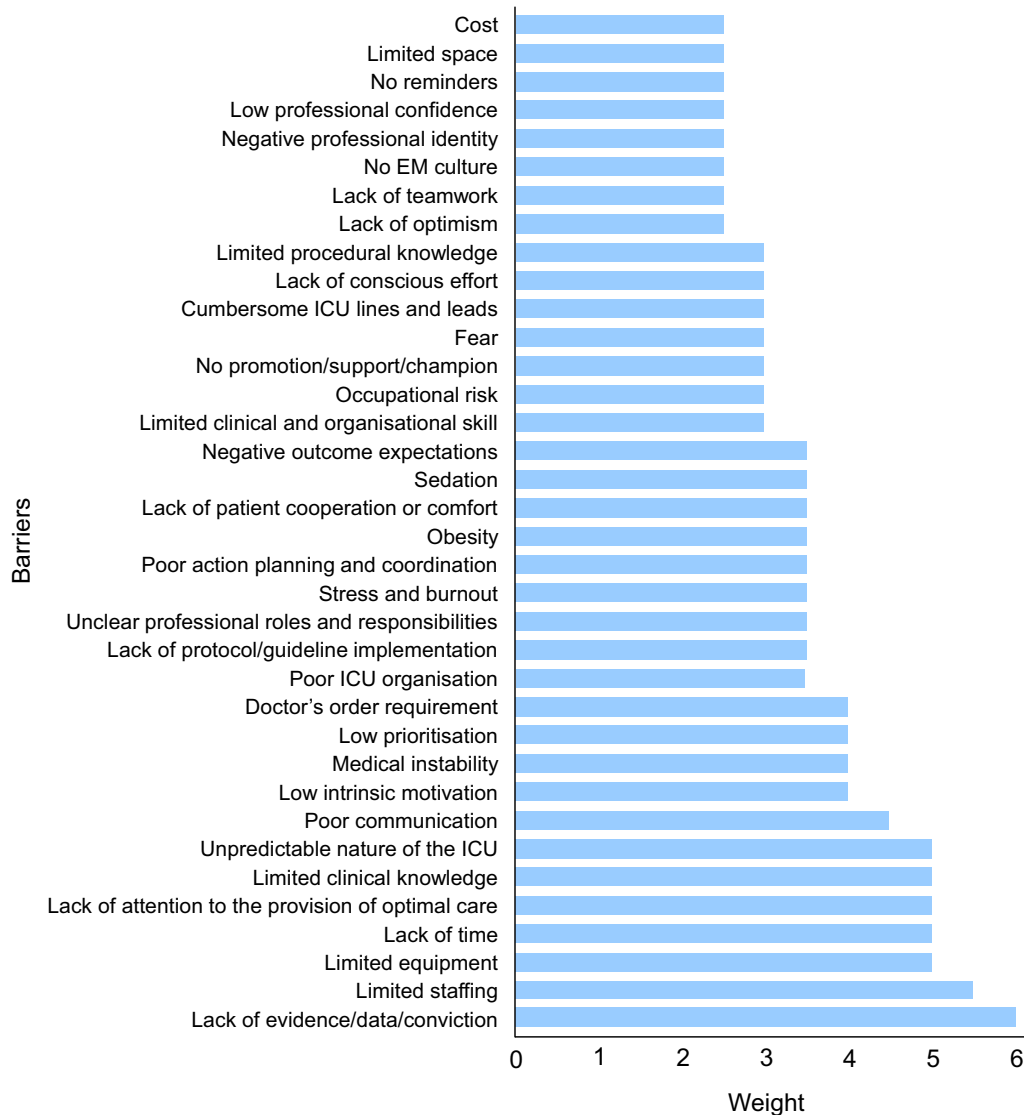
If you have a double [implying a nurse paired with two patients] and you're doing an 8-hour shift, it's very hard to... or if you've got a patient that has to go down to a test like CT scan, then you can't get it all done in 8 hours. (MDFG 3)

**Lack of time**

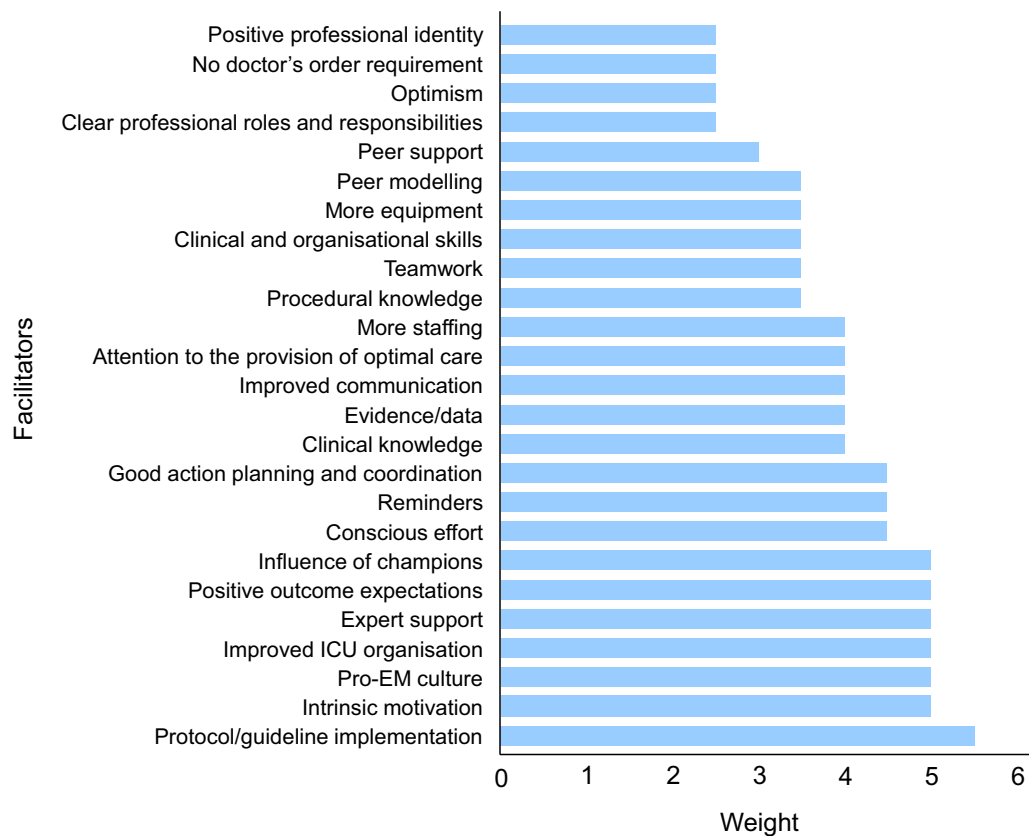
... sometimes it takes me an hour to organise. I go a thousand times around ICU2 and ICU1. I am trying to find the [right] time, but I know the orderly cannot be sure of the time [their availability], so it is hard. (MDFG 1)

**Limited equipment for early mobilisation**

We don't have enough [equipment]... it becomes difficult for the nurses and the physiotherapists or anyone who wants to mobilise... we don't have enough so that is it. (MDFG 1)



**Figure 1.** Barriers identified in the study and their assigned weights. Weights are based on a rating factor of two for each of the following criteria: frequency of quote, divergence of opinion and perceived impact on practice. EM = early mobilisation, ICU = intensive care unit.



**Figure 2.** Facilitators identified in the study and their assigned weights. Weights are based on a rating factor of two for each of the following criteria: frequency of quote, divergence of opinion and perceived impact on practice.

EM = early mobilisation, ICU = intensive care unit.

#### Poor communication

Speaker 1: *There is no information communication.*

Others: *Absolutely!*

Speaker 1: *... the orderlies, they know where is the chair... I [the nurse] don't know how many chairs, what I have available and what I don't have available. There is a gap in the communication 100%. (MDFG 1)*

#### Unpredictable nature of the ICU

*The level of activity and the unpredictability in the context... it makes it very complex... (MDFG 1)*

#### Belief about consequences domain

The key barrier identified in this domain was the belief, by some clinicians (especially physicians), that there is insufficient conviction regarding the potential benefits of early mobilisation or insufficient evidence or data to drive the implementation of early mobilisation practice.

#### Lack of evidence/data/conviction

*But for it to be done consistently people actually have to believe in it... I think that the lack of conviction may be the greatest obstacle. (PFG)*

*... the Salt Lake City study was not an RCT. It was an observational prospective study. We do have some RCTs as well, but you don't know whether it's because they had to change their sedation policy so that they could ambulate. Maybe that was the variable and not the ambulation. (PFG)*

#### Knowledge domain

Limited knowledge of the benefits of early mobilisation, the safety parameters for early mobilisation, the procedures for early mobilisation and the detrimental consequences of immobility were identified as barriers to early mobilisation.

#### Limited knowledge

*At times the nursing staff doesn't want to mobilise the patient because the patient has a PA catheter in place... although there are no actual contraindications if the patient is hemodynamically stable. (PFG)*

#### Memory, attention and decision processes domain

The lack of the ability to remember, selectively focus and choose care pathways that will result in optimal health benefits for the patient was identified as a barrier.

#### Lack of attention to the provision of optimal care

*Like you could have a patient who like gets up in the chair most of the days, but he has a certain nurse for the whole weekend... and the patient doesn't get up in the chair the whole weekend because they [the nurse] just didn't think of it. (MDFG 2)*

#### Key facilitators and their associated TDF domains

The key facilitators and illustrative quotes are given below.

#### Environmental context and resources domain

The presence of an organisational culture that encourages early mobilisation in an ICU (pro-early mobilisation culture),



reorganisation of the ICU (improved ICU organisation) and implementation of a protocol or guideline were identified as key facilitators in this domain. Participants from one hospital believed that implementation of a protocol/guideline would not promote the practice of early mobilisation.

#### Pro-early mobilisation culture

Speaker 1: *And then it [presence of a dedicated team] also takes care of increasing the awareness of the team towards going in favour of early mobilisation because if you see a dedicated team... you act on it, it is part of our culture, and you are more prone to think about it for your next patient.*

Others: *Yeah.* (MDFG 1)

#### Improved ICU organisation

*If we would have a dedicated team [for early mobilisation], like not using the [regular] orderlies, that will take care of all the probabilities and the uncertainties the regular team takes care of. It lessens the problem of the communication because it is a dedicated team that communicates with you.* (MDFG 1)

#### Protocol/guideline implementation

*Well if it's protocolised... they should just be done, right?... looking for contraindications, not for indications. And I think that's the key.* (PFG)

Speaker 1: *When I hear the word protocol, the first thing I think of is more paperwork that actually takes away more minutes from our availability to do actual things with the patient. It is something to... a piece of paper to write on that doesn't actually change the care of the patient in any... and more like it takes away from the patient.*

Speaker 2: *Yeah, a guideline would be a better idea than a protocol.*

Speaker 3: *I don't know if a guideline will make a difference though.* (MDFG 2)

#### Social influences domain

Facilitators under this domain included the influence of having the assistance of clinicians who are highly skilled in facilitating early mobilisation (expert support) and the promotion of early mobilisation by influential clinicians (influence of champions). Some participants mentioned that the presence of an expert who is both motivated and has the skill to assist them to carry out early mobilisation will have more impact than early mobilisation champions who push them to carry out the practice without getting involved.

#### Expert support

*I think with the physio present, a lot of nurses would feel more comfortable.* (MDFG 2)

#### Influence of champions

Speaker 1: *I said that we need to clone [mentions the name of another nurse].*

Others: *(waves of laughter)*

Speaker 1: *... but seriously, she's a champion, and she's motivated and... yeah it's a facilitator.* (MDFG 3)

#### Intentions domain

Being intrinsically motivated (intrinsic motivation) and making a conscious decision to implement early mobilisation were seen as strong facilitators.

#### Intrinsic motivation

*Nothing stops me from getting them up if they are able to get up... I will get them up if they can get up... no matter what.* (MDFG 3)

#### Conscious effort

*Some people [doctors] will stop the propofol or sedation for 2 hours, let the patient wake up, it depends. Then you as a nurse, you will have to sort of, that has to be done, I want my patient awake, so let's do it.* (MDFG 1)

#### Behavioural regulation domain

One facilitator found under this domain referred to the act of forming a plan or organising events to facilitate mobilisation (action planning and coordination).

#### Action planning and coordination

*In terms of organising the planning, I would personally put that higher partly because it's just such low hanging fruit. It's so easy, organisational things we can change almost easily.* (PFG)

#### Memory, attention and decision processes domain

Creating a reminder system to remind clinicians about early mobilisation was a facilitator that was highly emphasised, especially by the physicians.

#### Reminders

Speaker 1: *The nurses go through their little checklist, they have it all organised and it always has to come in the same order. And if we had just a rehab line that would act as a reminder for us... just saying 'from a rehab point of view, yesterday he stood'.*

Others: *Yeah, yes, yes, easily [the discussion continued about where on the clinical round checklist such a line could fit best].* (PFG)

#### Belief about consequences

Data showed that clinicians who expect a positive outcome (for the patient or the healthcare system) from early mobilisation were more likely to implement early mobilisation.

#### Positive outcome expectations

*If I knew that every day I got my patient up like twice a day, if I saw that... you know I saw that it cut a week off their stay in ICU, I would be... pushing that harder to get them up.* (MDFG 1)

#### Discussion

This study used focus groups underpinned by a structured theoretical framework, the TDF, to identify and deepen understanding of the multifaceted barriers to and facilitators of early mobilisation and how they influence clinical practice. The findings revealed 36 complex barriers and 25 facilitators perceived to influence the implementation of early mobilisation, which clustered primarily around 13 and 10 domains of the TDF, respectively. The findings of the current study suggest implications for several groups to improve early mobilisation in the ICU. Decision-makers should provide more resources (staffing and equipment) and create early mobilisation reminders. Clinicians should develop a positive early mobilisation culture, reorganise their ICUs, use early mobilisation reminders, and use and improve team communication. Researchers should synthesise the available evidence on the benefits of early mobilisation on several outcomes from robust clinical trials, and develop theory-based knowledge translation interventions to improve the knowledge and skills of ICU clinicians on early mobilisation.

The current findings are consistent with previous studies that identified barriers to and facilitators of early mobilisation.<sup>10–16</sup> A recent systematic review of 40 studies by Dubb et al<sup>36</sup> identified 28 early mobilisation barriers. While barriers in several TDF domains were also reported in that review,<sup>36</sup> the present study identified additional barriers in these domains: *Belief about capabilities*, *Optimism*, *Intention*, and *Memory, attention and decision processes*. Furthermore, some of the barriers were uniquely identified for the first time in the current study under these domains: *Social and professional roles* (professional identity and teamwork), *Belief about consequences* (negative outcome expectation, lack of evidence/data/conviction), and *Emotion* (fear). The differences between the current findings and those from the 40 studies included in the systematic review by Dubb et al<sup>36</sup> may be explained primarily by the differences in the design and methods used to identify the barriers and the differences in the settings and participants. Furthermore, the analyses in the few qualitative studies that were included in the review were not informed by a theoretical framework. These differences explain the distinct contribution of the current study.

In the current study, respondents from an initial cross-sectional survey study on early mobilisation<sup>10</sup> in the same three ICUs were followed up. While both studies identified that limited resources constitute part of the greatest barrier to early mobilisation, the survey<sup>10</sup> failed to identify barriers from six of the 13 domains found in the current study (*Beliefs about capabilities*, *Optimism*, *Belief about consequences*, *Intentions*, *Emotion*, and *Memory, attention and decision processes*). Unlike in the survey, which found primarily physical and organisational barriers, close to 40% of barriers in the current study were related to clinicians' attitudes. Finally, contrary to the current study, medical instability, the presence of ICU lines, sedation, and safety concerns of clinicians were the greatest barriers in the survey. These differences highlight limitations associated with survey methodology.<sup>17,37</sup>

This study had several strengths. Unlike most studies that have investigated barriers to early mobilisation, this study included the perspectives of respiratory therapists, who may be particularly important in the mobilisation of mechanically ventilated patients in some jurisdictions. Also, it is the only early mobilisation study that has used the TDF to guide its qualitative analysis, which limited the risk of omitting important areas when considering factors that impede implementation of evidence-based practice.<sup>25</sup> Two researchers analysed the results in order to minimise bias. Data saturation was achieved. A multi-criteria decision-making model (the Pugh Matrix Analysis), which is a novel approach, was used to determine the relative importance of TDF domains and identify the key barriers and facilitators. The barriers and facilitators were derived from discussions generated by practising ICU clinicians. People's attitudes are precursors to individuals' intention to do something or not, which drives professional behaviour.<sup>38,39</sup> Theory-based knowledge translation interventions are more likely to effect behavioural change, which could result in better health outcomes.<sup>40</sup> The results of this study could, therefore, be used in the design of theory-based knowledge translation interventions by using the TDF to guide the choice of behaviour change techniques and intervention components,<sup>41,42</sup> as has been done previously.<sup>20</sup>

The current study also had some limitations. The frequency counts reported from the analysis involved only items that were judged as 'independent quotes'. An alternative way of counting every quote (such as including agreements to a previous idea) may have produced some differences in the frequency counts. The results comprise the subjective opinions of the focus group participants, which might have varied with different participants. The authors of the present study also acknowledge the fact that volunteers to a focus group meeting are most likely people who are passionate about the subject matter, which is a common limitation of focus group methodology.<sup>43</sup> Data saturation for the physician group may not have been attained, considering that a sufficient number of participants for only one focus group was able to be recruited. New barriers or facilitators may have surfaced with additional focus groups. Finally, the inclusion of managers might have further

enriched the findings and provided additional solutions for implementing changes to increase the uptake of early mobilisation of critically ill patients in the ICU.

This is the first study use the TDF to examine potential barriers to and facilitators of early mobilisation in the ICU. The study identified 36 barriers and 25 facilitators in 13 and ten domains of the TDF, respectively. Many of the identified barriers and facilitators were related to clinician behaviour and had not been identified in earlier studies. These findings may be used to inform the design and evaluation of theory-based knowledge translation interventions designed to improve early mobilisation practice.

**What was already known on this topic:** It is safe and feasible for many patients in intensive care units to be mobilised early in their admission. Despite being recommended to improve patient outcomes, early mobilisation is not provided to many patients in intensive care units. Barriers and facilitators of early mobilisation may be patient-related, structural, process-related or related to the intensive care unit culture.

**What this study adds:** Previously identified barriers and facilitators were confirmed. Additional novel barriers and facilitators were identified, many of which were related to clinician behaviour. Other novel barriers included fear, expectation of a negative outcome and lack of evidence or conviction.

**Footnote:** <sup>a</sup> QDA Miner software, Lite version 2.0, Provalis Research, Montreal, Canada.

**eAddenda:** Appendix 1 can be found online at <https://doi.org/10.1016/j.jphys.2020.03.001>.

**Ethics approval:** The McGill University Ethics Committee and the ethics committees of the participating hospitals approved this study. All participants gave written informed consent before data collection began.

**Competing interest:** Nil.

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## References

1. Fan E, Dowdy DW, Colantuoni E, Mendez-Tellez PA, Sevransky JE, Shanholtz C, et al. Physical complications in acute lung injury survivors: a two-year longitudinal prospective study. *Crit Care Med*. 2014;42:849–859.
2. Sidiras G, Gerovasili V, Patsaki I, Karatzanos E, Papadopoulos E, Markaki V, et al. Short and long term outcomes of ICU acquired weakness. *Health Sci J*. 2013;7:188–200.
3. Kress JP, Hall JB. ICU-acquired weakness and recovery from critical illness. *N Engl J Med*. 2014;370(17):1626–1635.
4. Nydahl P, Ruhl AP, Bartoszek G, Dubb R, Filipovic S, Flohr HJ, et al. Early mobilisation of mechanically ventilated patients: a 1-day point-prevalence study in Germany. *Crit Care Med*. 2014;42:1178–1186.
5. Berney S, Harrold M, Webb S, Seppelt I, Patman S, Thomas P, et al. Intensive care unit mobility practices in Australia and New Zealand: a point prevalence study. *Crit Care Resusc*. 2013;15:260–265.
6. Kleinpell RM. How early should we mobilise ICU patients? Medscape. [https://www.medscape.com/viewarticle/750458\\_2](https://www.medscape.com/viewarticle/750458_2). Published 2011. Accessed 26 March, 2018.
7. Kayambu G, Boots R, Paratz J. Physical therapy for the critically ill in the ICU: a systematic review and meta-analysis. *Crit Care Med*. 2013;41:1543–1554.
8. Castro-Avila AC, Seron P, Fan E, Gaete M, Mickan S. Effect of early rehabilitation during intensive care unit stay on functional status: systematic review and meta-analysis. *PLoS One*. 2015;10:e0130722.

9. Nydahl P, Sricharoenchai T, Chandra S, Kundt FS, Huang M, Fischill M, et al. Safety of patient mobilisation and rehabilitation in the intensive care unit. Systematic review with meta-analysis. *Ann Am Thorac Soc.* 2017;14:766–777.
10. Anekwe DE, Koo KK, de Marchie M, Goldberg P, Jayaraman D, Spahija J. Inter-professional survey of perceived barriers and facilitators to early mobilisation of critically ill patients in Montreal, Canada. *J Intensive Care Med.* 2019;34:218–226.
11. Koo KK, Choong K, Cook DJ, Herridge M, Newman A, Lo V, et al. Early mobilisation of critically ill adults: a survey of knowledge, perceptions and practices of Canadian physicians and physiotherapists. *CMAJ Open.* 2016;4:E448–E454.
12. Winkelman C, Peereboom K. Staff-perceived barriers and facilitators. *Crit Care Nurse.* 2010;30:S13–S16.
13. Barber EA, Everard T, Holland AE, Tipping C, Bradley SJ, Hodgson CL. Barriers and facilitators to early mobilisation in intensive care: a qualitative study. *Aust Crit Care.* 2015;28:177–182.
14. Jolley SE, Regan-Baggs J, Dickson RP, Hough CL. Medical intensive care unit clinician attitudes and perceived barriers towards early mobilisation of critically ill patients: a cross-sectional survey study. *BMC Anesthesiol.* 2014;14:84.
15. Bakhru RN, Wiebe DJ, McWilliams DJ, Spuhler VJ, Schweickert WD. An environmental scan for early mobilisation practices in US ICUs. *Crit Care Med.* 2015;43:2360–2369.
16. Malone D, Ridgeway K, Nordon-Craft A, Moss P, Schenkman M, Moss M. Physical therapist practice in the intensive care unit: results of a national survey. *Phys Ther.* 2015;95:1335–1344.
17. Wolff B, Knodel J, Sittitrai W. Focus groups and surveys as complementary research methods: a case example. In: Morgan DL, ed. *Successful focus groups: advancing the state of the art.* Thousand Oaks, California: SAGE Publications, Inc.; 1993.
18. Ward VM, Bertrand JT, Brown LF. The comparability of focus group and survey results. *Eval Rev.* 1991;15:266–283.
19. Evidence base at the University of Central England in Birmingham. Focus groups: reasons for using focus groups. <http://www.evalued.bcu.ac.uk/tutorial/4b.htm>. Published 2006. Accessed 15 June, 2017.
20. French SD, Green SE, O'Connor DA, McKenzie JE, Francis JJ, Michie S, et al. Developing theory-informed behaviour change interventions to implement evidence into practice: a systematic approach using the Theoretical Domains Framework. *Implement Sci.* 2012;7:38.
21. Bartholomew LK, Parcel GS, Kok G. Intervention mapping: a process for developing theory and evidence-based health education programs. *Health Educ Behav.* 1998;25:545–563.
22. Foy R, Francis JJ, Johnston M, Eccles M, Lecouturier J, Bamford C, et al. The development of a theory-based intervention to promote appropriate disclosure of a diagnosis of dementia. *BMC Health Serv Res.* 2007;7:207.
23. Michie S, Johnston M, Abraham C, Lawton R, Parker D, Walker A. Making psychological theory useful for implementing evidence based practice: a consensus approach. *Qual Saf Health Care.* 2005;14:26–33.
24. Cane J, O'Connor D, Michie S. Validation of the theoretical domains framework for use in behaviour change and implementation research. *Implement Sci.* 2012;7:37.
25. Bussi eres AE, Patey AM, Francis JJ, Sales AE, Grimshaw JM. Identifying factors likely to influence compliance with diagnostic imaging guideline recommendations for spine disorders among chiropractors in North America: a focus group study using the Theoretical Domains Framework. *Implement Sci.* 2012;7:82.
26. Keddy B, Gillis MJ, Jacobs P, Burton H, Rogers M. The doctor-nurse relationship: an historical perspective. *J Adv Nurs.* 1986;11:745–753.
27. Zelek B, Phillips SP. Gender and power: Nurses and doctors in Canada. *Int J Equity Health.* 2003;2:1.
28. Robinson N. The use of focus group methodology—with selected examples from sexual health research. *J Adv Nurs.* 1999;29:905–913.
29. Provalis R. QDA Miner Lite – Free Qualitative Data Analysis Software. <https://provalisresearch.com/products/qualitative-data-analysis-software/freeware/>. Accessed 3 July, 2017.
30. Hsieh HF, Shannon SE. Three approaches to qualitative content analysis. *Qual Health Res.* 2005;15:1277–1288.
31. Cervone HF. Applied digital library project management: Using Pugh matrix analysis in complex decision-making situations. *OCLC Systems & Services: International digital library perspectives.* 2009;25:228–232.
32. Triantaphyllou E. Multi-criteria decision making methods. In: *Multi-criteria decision making methods: a comparative study.* Boston: Springer; 2000.
33. Cervone HF. Strategic analysis for digital library development. *OCLC Systems & Services: International digital library perspectives.* 2009;25:16–19.
34. Francis JJ, Stockton C, Eccles MP, Johnston M, Cuthbertson BH, Grimshaw JM, et al. Evidence-based selection of theories for designing behaviour change interventions: using methods based on theoretical construct domains to understand clinicians' blood transfusion behaviour. *Br J Health Psychol.* 2009;14:625–646.
35. Francis JJ, Johnston M, Robertson C, Glidewell L, Entwistle V, Eccles MP, et al. What is an adequate sample size? Operationalising data saturation for theory-based interview studies. *Psychol Health.* 2010;25:1229–1245.
36. Dubb R, Nydahl P, Hermes C, Schwabbauer N, Toonstra A, Parker AM, et al. Barriers and strategies for early mobilisation of patients in intensive care units. *Ann Am Thorac Soc.* 2016;13:724–730.
37. Dafoe S, Chapman MJ, Edwards S, Stiller K. Overcoming barriers to the mobilisation of patients in an intensive care unit. *Anaesth Intensive Care.* 2015;43:719–727.
38. Ajzen I. The theory of planned behavior. *Organ Behav Hum Decis Process.* 1991;50:179–211.
39. Triandis HC. Values, attitudes, and interpersonal behavior. *Nebr Symp Motiv.* 1979;27:195–259.
40. Hardeman W, Sutton S, Griffin S, Johnston M, White A, Wareham NJ, et al. A causal modelling approach to the development of theory-based behaviour change programmes for trial evaluation. *Health Educ Res.* 2005;20:676–687.
41. Michie S, Johnston M, Francis J, Hardeman W, Eccles M. From theory to intervention: mapping theoretically derived behavioural determinants to behaviour change techniques. *Appl Psychol.* 2008;57:660–680.
42. Atkins L, Francis J, Islam R, O'Connor D, Patey A, Ivers N, et al. A guide to using the Theoretical Domains Framework of behaviour change to investigate implementation problems. *Implement Sci.* 2017;12:77.
43. Leung F-H, Savithiri R. Spotlight on focus groups. *Can Fam Physician.* 2009;55:218–219.