Multidisciplinary team healthcare professionals' perceptions of current and optimal acute rehabilitation, a hip fracture example

A UK qualitative interview study informed by the Theoretical Domains Framework

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Abstract

Objective:

To understand multidisciplinary team healthcare professionals' perceptions of current and optimal provision of acute rehabilitation, perceived facilitators and barriers to implementation, and their implications for patient recovery, using hip fracture as an example.

Methods:

A qualitative design was adopted using semi-structured telephone interviews with 20 members of the acute multidisciplinary healthcare team (occupational therapists, physiotherapists, physicians, nurses) working on orthopaedic wards at 15 different hospitals across the UK. Interviews were audio-recorded, transcribed verbatim, anonymised, and then thematically analysed drawing on the Theoretical Domains Framework to enhance our understanding of the findings.

Results:

We identified four themes: *conceptualising a model of rehabilitative practice*, which reflected the perceived variability of rehabilitation models, along with facilitators and common patient and organisational barriers for optimal rehabilitation; *competing professional and organisational goals*, which highlighted the reported incompatibility between organisational goals and person-centred care shaping rehabilitation practices, particularly for more vulnerable patients; *engaging teams in collaborative practice,* which related to the expressed need to work well with all members of the multidisciplinary team to achieve the same person-centred goals and share rehabilitation practices; and *engaging patients and their carers*, highlighting the importance of their involvement to achieve a holistic and collaborative approach to

rehabilitation in the acute setting. Barriers and facilitators within themes were underpinned by the lack or presence of adequate ways of communicating with patients, carers, and multidisciplinary team members; resources (e.g. equipment, staffing, group classes), and support from people in leadership positions such as management and senior staff.

Conclusions:

Cornerstones of optimal acute rehabilitation are effective communication and collaborative practices between the multidisciplinary team, patients and carers. Supportive management and leadership are central to optimise these processes. Organisational constraints are the most commonly perceived barrier to delivering effective rehabilitation in hospital settings, which exacerbate silo working and limited patient engagement.

Introduction

Rehabilitation is defined as "a set of interventions designed to optimise functioning and reduce disability in individuals with health conditions in interaction with their environment"[1]. When delivered effectively, rehabilitation leads to improved patient, healthcare, and societal outcomes including reduction in health inequalities[2]. In the United Kingdom (UK), there is a translation gap between what is known to be effective and what is possible given available resources [3]. This translation gap leads to variation in the organisation of rehabilitation across care settings with commissioners making different decisions on how best to allocate available resources locally, regionally, and nationally[4,5]. These decisions have knock on effects for clinical managers and clinicians themselves when determining how best to prioritise rehabilitation caseloads given available resources [6].

The first phase of rehabilitation reflects the onset of an acute illness or injury (or exacerbation of a chronic illness) often for patients with complex care needs requiring specialist support and

61 predominantly takes place in the acute hospital setting[2]. This phase of rehabilitation would
62 appear to be the most ‘protocolised’ as patients are cared for 24 hours a day 7 days per week
63 in a standard hospital setting often with targeted key performance indicators to enable discharge
64 as early as possible [7]. It is usual to anticipate a degree of variation in access to, and delivery
65 of, rehabilitation interventions as individuals (even with the same diagnosis) will have different
66 needs, abilities, and expectations for recovery [8]. However, the extent to which this variation
67 is attributable to differences in patient characteristics has been called into question, with several
68 reports of variation due to differences in the organisation and delivery of rehabilitation even
69 during this initial more protocolised phase [9–12]. This variation has potentially negative
70 implications for patients as of how well an individual progresses during this early phase of
71 rehabilitation is often used as a criterion for access to further rehabilitative services across the
72 care continuum [7].

73 Hip fracture is a good example of observed variations in acute rehabilitation despite a
74 protocolised approach to care [13]. On average, 65,000 older adults are admitted with hip
75 fracture to an acute hospital in England and Wales each year[14]. The injury reflects a
76 heterogeneous population of older adults, many of whom present with other comorbidities, live
77 in domiciliary and residential/nursing care settings, with different levels of prefracture
78 functional ability and available social support [9,15]. On admission to hospital, patients will
79 begin a protocol for hip fracture care typically comprising six key performance indicators –
80 prompt orthogeriatric assessment, prompt surgery, guideline recommended surgical approach,
81 prompt mobilisation after surgery, assessment for delirium, and return to original residence,
82 which are audited and publicly reported nationally[14]. These indicators underpin a
83 multidisciplinary team approach to care which is often dominated by rehabilitation during the
84 acute hospital stay as most patients undergo surgery within 36-hours of an average stay of 15

85 days [14]. However, despite national audit and public reporting, variations in access and
86 delivery of care persists for this patient population [16].

87 To date, there have been several qualitative studies exploring healthcare professional
88 perspectives of variation in access to, and delivery of, rehabilitation after hip fracture[17–24].
89 These studies have mainly focused on individual professional groups[17,24] and highlight
90 resource constraints [17,18,22,24], poor patient engagement[17,19,22–24], and limited
91 multidisciplinary team engagement [17,18,20,21,23] as key contributors of unwarranted
92 variation in rehabilitative care across hospitals. Despite the multidisciplinary nature of
93 rehabilitation there are few studies which consider the perspectives of different
94 multidisciplinary team members regarding what optimal rehabilitation after hip fracture looks
95 like, and the perceived barriers to its implementation [20–22]. The Theoretical Domains
96 Framework (TDF) offers a useful lens to explore this further as it was originally designed to
97 identify determinants of current and desired behaviour that can lead to implementation
98 problems, such as the delivery of optimal rehabilitation after hip fracture [25]. The TDF
99 encompasses 12 domains: knowledge, skills, social/professional role and identity, beliefs about
100 capabilities, beliefs about consequences, motivation and goals, memory attention and decision
101 processes, environmental context and resources, social influences, emotion, behavioural
102 regulation, and nature of behaviour/s. The domains enable structuring of qualitative data to
103 identify behaviours and implementation barriers and facilitators to target for intervention. Once
104 these determinants of behaviour are identified, they offer a useful framework for the choice of
105 future quality improvement interventions.

106 The aim of this study was to understand multidisciplinary team healthcare professionals'
107 perceptions of current and optimal provision of acute rehabilitation, perceived facilitators and
108 barriers to implementation, and their implications for patient recovery, using hip fracture as an

109 example. The analysis draws on the TDF to enhance our understanding of what professional
110 behaviours and implementation facilitators and barriers to target, in order to improve provision
111 of optimal rehabilitation in acute hospital settings.

112 Materials and methods

113 This study is reported according to the Consolidated Criteria for Reporting Qualitative
114 Research (COREQ) checklist" [26]. We received institutional ethical (REC reference: LRM-
115 20/21-21197) and local governance approvals to conduct this study from the Research Ethics
116 Office at Kings College London.

117 Study design

118 A qualitative design was used to provide an in-depth understanding of multidisciplinary
119 healthcare professionals' perspectives of current and optimal acute rehabilitation and perceived
120 implementation facilitators and barriers. The study was underpinned by an interpretivist
121 philosophical view of the social world which is based on the premise that our knowledge of
122 reality is socially constructed by our perceptions and interpretations of it.

123 Eligibility criteria

124 We aimed to recruit multidisciplinary team healthcare professionals, including
125 physiotherapists, occupational therapists, nurses, and physicians with at least 2 years
126 experience of working within acute rehabilitation after hip fracture in the UK . There was no
127 additional inclusion or exclusion criteria. This was in order to gain insight from a range of
128 different professional groups.

Sampling and recruitment

We used a convenience sampling approach [28] to recruit multidisciplinary team healthcare professionals by advertising the study through relevant professional societies (Chartered Society of Physiotherapy, Royal College of Occupational Therapists, Royal College of Nursing, and the British Geriatrics Society) and via Twitter.

Data collection

Potential participants contacted one member of the research team (KL) by email to express their interest in taking part in the study, receive the participant information sheet and consent form, and ask questions. Interested participants return signed consent forms by email. Individual semi-structured telephone interviews were conducted by one author (KL). KL initially piloted the topic guide with one healthcare professional through established contacts with the research team after which the transcript was reviewed by three authors (KL, ES, KS) and the interview topic guide was further refined prior to commencing the interviews. The topic guide comprised a series of semi-structured open-ended questions and relevant prompts, when needed, seeking to capture multidisciplinary team healthcare professional perspectives on current and optimal provision of rehabilitation after hip fracture in an acute hospital setting, perceived barriers and facilitators to implementation, and implications for recovery. The topic guide was theoretically informed, with questions and prompts mapped to the TDF to ensure the topic guide would enable generation of data related to individual, social, and environmental determinants of behaviours and implementation barriers as part of this framework (Supplementary File 1). Interviews were audio-recorded, transcribed verbatim and anonymised by an external professional translation service prior to data analysis.

Data analysis

Data analysis proceeded until data saturation was deemed to have been reached, in which no new relevant themes were emerging from the qualitative data [27]. A thematic analysis approach was used to analyse and organise themes grounded in the qualitative data [29], drawing on the TDF [25] to enhance our understanding of what behaviours and implementation barriers and facilitators were perceived to influence optimal rehabilitation in acute hospital settings.

Specifically, the qualitative analysis process involved a number of phases. The first phase involved three authors (SG, GM, KL) reading all transcripts, generating initial themes (codes), and grouping similar themes together (initial and axial coding) in NVivo (version 12) [29]. In the second phase these clusters of codes were used to organise initial themes into conceptual themes and related subthemes using the 'one sheet of paper method' approach, whereby similar and diverse perspectives among participants were identified across different professional groups [30]. The final phase involved mapping the findings within each theme to the TDF domains to identify behaviours and implementation barriers and facilitators perceived to influence optimal rehabilitation in acute hospital settings (see Supplementary file 2 for an example). These themes were refined iteratively with discussions within the research group. The final themes were discussed and agreed among the research team. A summary of final themes were also sent back to study participants by email for member checking, of whom only one participant replied stating the findings made sense to them.

Research team and reflexivity

All interviews were completed by KL a research assistant and health psychologist with prior experience of interviewing patients and healthcare professionals working with older adults with

174 dementia. Participants were aware of KL's research role and that she did not have direct
175 involvement with patient care. KL did not disclose any assumptions or reasons for doing the
176 research and/or interest in the research topic prior to, during, or after conducting the interviews.
177 Analyses were completed by SG, GM, and KL with iterative discussions with ES and KS. SG
178 and GM are research assistants with experience of qualitative research. KS is a physiotherapist
179 and researcher with expertise in hip fracture health services research. ES is a social scientist
180 and physiotherapist working in social science applied health and implementation science
181 research, with expertise in qualitative research methods. Thus, we considered the
182 interdisciplinary nature of the research team enhanced quality in this study because the team
183 brought together multiple perspectives to understand how acute rehabilitation after hip fracture
184 could be optimised based on multidisciplinary team healthcare professionals' perceptions. This
185 aligned with our interpretivist philosophical view of reality as socially constructed.

186 # Results

187 ## Participant characteristics

188 Interviews (ranging between 32-51 minutes) were carried out with 20 health care professionals
189 with a median of 17 years (interquartile range: 7, 21) of clinical experience (see Table 1). These
190 included seven occupational therapists, six physiotherapists, three nurses, three geriatricians,
191 and one orthopaedic surgeon, employed across England and Scotland. Most participants were
192 female (n = 18) and had no research experience (n = 15).

Table 1. Participant characteristics

Participant ID	Gender	Occupation	Clinical experience (years)	Research experience	Location	Number of hip fractures seen per year at site
1	Male	Orthopaedic surgeon, lead clinician	32	Yes	South England	>300-500

2	Female	Orthogeriatric consultant	27	Yes	North England	100-300
3	Female	Occupational therapist	25	No	North England	>300-500
4	Female	Nurse	23	Yes	East England	100-300
5	Female	Orthopaedic physiotherapist, team lead	21	No	South England	>300-500
6	Female	Orthopaedic physiotherapist, team lead	21	No	Scotland	>300-500
7	Female	Nurse	19	No	Scotland	>500
8	Male	Occupational therapist, team lead	18	No	East England	100-300
9	Female	Orthogeriatric consultant	18	No	North England	>300-500
10	Female	Occupational therapist and senior research fellow	17	Yes	East England	100-300
11	Female	Trauma and orthopaedic physiotherapist	17	No	East England	>300-500
12	Female	Trauma and orthopaedic physiotherapist, team lead	13	No	South England	>300-500
13	Female	Occupational therapist	12	Yes	North England	>300-500
14	Female	Physiotherapist, inpatient team lead	10	No	South England	>300-500
15	Female	Trauma and orthopaedic physiotherapist	7	No	North England	<100
16	Female	Occupational therapist	7	No	Scotland	>500
17	Female	Occupational therapist, clinical lead	7	No	North England	>300-500
18	Female	Occupational therapist	6.5	No	Scotland	>500
19	Female	Orthogeriatric consultant	3.5	No	South England	>300-500
20	Female	Nurse and clinical educator	3.5	No	East England	100-300

193 ## Themes

194 Four key themes and related subthemes were identified during the analysis: conceptualising a
195 model of rehabilitative practice; competing professional and organisational goals; engaging
196 teams in collaborative rehabilitation and; engaging patients and their carers. These themes were
197 mapped to belief statements and domains of the TDF, with illustrative participant quotations
198 in Table 2, and subsequently organised into perceived facilitators and barriers to
199 implementation of optimal provision of rehabilitation in Table 3. Specific domains related to
200 the TDF are indicated in brackets in the themes below.

Table 2: Domains of the Theoretical Domains Framework as they relate to themes and belief statements, with supporting quotes from multidisciplinary participants.

Domain	Theme	Belief statements	Illustrative quotations
Knowledge	engaging teams in collaborative practice	communicating and learning from other health professionals helps to deliver optimal rehabilitation	"We meet with them [orthopeadic trauma group] every morning for a brief handover and then we're, we're kind of constantly in touch through the day really, it's a really great close working relationship where I can ask them about you know, why does somebody faint when they stand up or whether their pain in inhibiting their therapy or, and they can come and ask me because we're around on the ward a lot, we work very, very closely together." (P2, orthogeriatric consultant)
	engaging patients and their carers	carers can provide helpful information about how to engage patients in rehabilitation	"We try and liaise with our carers and the relatives as often as possible, discuss any potential problems we might have with them such as how to, if they've become low in mood if it's normal for them and how, if there's anything they do at home to improve it." (P20, nurse)

Skills	competing professional and organisational goals	rehabilitation requires to regularly adapt to the constant variability of patients presenting with hip fracture	"You can have a very active 70-year-old. I would say all the patients are very different and very individual … I very much react to the patient, it's very individual, I react to the patient's needs at the time. I can't say I use a standard approach." (P3, OT)
	engaging teams in collaborative practice	healthcare professionals need to adapt their way of working together according to patients' individual needs and abilities	"So for somebody who is normally very well or functional, drives a car, gets out and about and they've literally tripped over something and broken a hip, then their rehabilitation is largely going to be the physiotherapist because their needs, otherwise, aren't so great. For somebody who is much frailer with cognitive impairment and delirium and lives at home and has a lot of functional deficit, then actually the physiotherapist may not have as much a role to play. It may be more occupational therapy and me and the nursing staff." (P9, orthogeriatric consultant)
		multidisciplinary training and shared learning facilitate a standard and collaborative approach to rehabilitation	"So we've given the empowerment, if you like, we don't have to get a patient up on day zero, nursing staff will do it. So we've gone in with them, we've taught them, we've given them the competencies, they're competent to do it, they take the same assessments as we do and they can get them up and get them going." (P5, physiotherapist)
	engaging patients and their carers	healthcare professionals need to educate carers and patients on what optimal rehabilitation involves	"I think that health professionals have a role in talking to the family, quite often family can be overprotective and can wrap their loved ones up in cotton wool and it's about educating them as well in terms of being safe but encouraging activity or encouraging appropriate tasks to aid them in their recovery." (P10, OT and research fellow)

		healthcare professionals need to support and reassure patients	"I think just thinking about the emotional bit as well, it's quite often people with a fractured hip experience trauma and that's quite often very emotional for them and they don't often see that straightaway … so it's just being ready for when that happens and being able to support them." (P10, OT and research fellow)
Social/ professional role and identity	conceptualizing a model of rehabilitative practice	supportive leadership and management are a main driver to deliver and improve rehabilitation	"I think we've got the right people behind us that have the drive not only to push these models forward but also to keep them going." (P20, nurse)
	competing professional and organisational goals	the imperative for early discharge is not always aligned with healthcare professionals' views of optimal rehabilitation	"[T]here's a big push to get people home and do all the care, the acute rehab in the home, but you know, I've always argued that a patient has to be able to do a basic minimum before they can get home." (P6, physiotherapist)
		rehabilitation for more vulnerable patients is particularly challenging when aiming to meet organisational goals	"If you've got somebody who is incredibly elderly and frail who wasn't great before they came in and struggling, they're going to really struggle … pushing the physiotherapy two, three times a day." (P7, nurse)
	engaging teams in collaborative practice	collaborative practices are an essential aspect of rehabilitation	"I think it's really important that it's a multi-professional approach. I don't think one particular professional input is more valid than another, it really is a team effort with the end goal of getting the patient really to the best place on discharge." (P8, Band 7 OT)
		collaborative practices are possible and maintained through supportive	"I think it's just that ethos and that culture, and maybe between the senior sister and ourselves as team leaders within the therapy, whether that would perhaps help, if we had a bit more cohesion

		management and shared leadership	between us, that we'd then pass on throughout the teams." (P12, physiotherapist)
	engaging patients and their carers	explaining rehabilitation likely processes and reassuring patients is part of rehabilitation	"So with the patient, it's managing their expectations. You know, it's a big, catastrophic event for them so it's more a case of sort of explaining to them, this is fine, you will recover from this, education, education, education. This is what we expect you to get back to and this is how long it's going to take." (P5, physiotherapist)
		all health professionals need to encourage patients taking ownership of their own recovery	"[I] explain to patients, part of your rehab isn't just the time that you spend with the physio or with the OT, it's also the time walking out to the bathroom with the nurse or the healthcare assistant or even by yourself is a part of your rehab because that's you starting to use your muscles again and starting to practice your walking etc, that lots of activity that you're doing in hospital without maybe another person being there with you." (P19, orthogeriatric consultant)
Belief about capabilities	conceptualizing a model of rehabilitative practice	optimal rehabilitation is facilitated when health professionals take responsibility and decide as a team over patients' journey	"We had very good MDT working, very good communication between particularly the OTs, the physios and the nurses on which patients we were accepting in the first place so, you know, on their referral we could say, yes they're absolutely appropriate, yes they've got rehab goals, yes this is for them." (P14, physiotherapist)
	engaging teams in collaborative practice	rehabilitation requires healthcare professionals working well together towards the same goals	'I think it needs to be everybody working towards the same thing and if I's not then it's not going to work because it's you know, we can't do the physio rehab without the pain management or without the fluid management or without the skin care you know, everything's got to link up. "(P6, physiotherapist)
		collaborative practices are facilitated when healthcare	"So physio and OT here tend to work quite separately, we don't tend to work as a big team, we tend to do a lot of separate working so

		professionals are flexible about the perceived boundaries of their roles	physio you know, will go and see a patient in the morning and then OT will go later on but we don't tend to join up necessarily and sometimes I think there is a lot of duplication, so I think possibly if we could make a difference to maybe more joint working between physio and OT and seeing all patients with assistance of two that would help." (P18, OT)
	engaging patients and their carers	all health professionals need to encourage patients' independence	"It's not for us to start washing somebody that's washed themselves for seventy-odd years unless they actually need us to do it. So everything like that, promoting independence as much as possible, yeah, it's almost cruel to be kind. It's the more you do for somebody the less they're going to do and the less they're going to progress in rehab for you." (P7, nurse)
Optimism	conceptualizing a model of rehabilitative practice	rehabilitation becomes more challenging when patients have additional comorbidities or are from out of area	"[In] my very short career I've seen a massive change in the patients' presentation, their ability and their sort of like functional decline really" (P17, OT)
	competing professional and organisational goals	healthcare professionals need various adaptations to their typical way of working to rehabilitate more vulnerable patients	"We very much will still see them [patients with cognitive impairment] and try and make it functional, we'll try and work more with the nursing staff so you know, if the nursing staff are doing a wash and then the patient needs to toilet, so maybe we'll use that an opportunity to assess them transferring to get to the toilet." (P6, physiotherapist) "A lot of people obviously with cognitive impairment won't be able to work with you, so it's really trying to maximise what they can do, but they're not going to be able to engage with physiotherapy in a traditional sense of following instructions. So it's working out for

			each individual patient, as a team, what their goal of treatment and therapy is going to be." (P9, orthogeriatric consultant)
	engaging patients and their carers	additional activities and resources help ameliorate the emotional impacts of rehabilitation	"We have activities coordinator on the ward, and kind of if the patient's confused, you'll try and engage them in just like a small task, for example playing music and chatting with them … because sometimes to get a patient out into the chair and just, they'll just sit there, so he was very good at lifting patients' spirit. And he's quite vital to that patient journey. (P15, physiotherapist)
Intentions	conceptualizing a model of rehabilitative practice	sharing responsibilities helps to deliver rehabilitation in the face of organisational constraints	"A lot of our occupational therapy time can be documentation as well, doing referrals for packages of care, and community services and things like that, so you know, sometimes our physio colleagues will try and share the workload, which is also a great factor as well. And in turn, then you know, we've got quicker kind of assessments on the ward." (P16, OT)
	competing professional and organisational goals	advocating for patients as a team helps rehabilitation in the face of organisational constraints	"I think we've got enough people on the ward who are advocates for the patients, that we can normally get the result we want if we're facing adversity from kind of the powers that be, or from a discharge planning kind of aspect." (P11, physiotherapist)
		working towards meeting organisational goals detracts from delivering person-centred care	"[I]n the acute service it's so driven towards just getting someone out of hospital that you can sometimes lose sight of that individual needs." (P16, physiotherapist)
Goals	competing professional and organisational goals	healthcare professionals' and organisational views of rehabilitation tend to differ	"Yes we can get somebody back to their care home within 3 days, and then the hospital management are happy and the NHS as a whole are happy because it's then a bed that we've freed up, but for that individual patient I don't think it's added very much to their care." (P9, orthogeriatric consultant)

	engaging patients and their carers	rehabilitation is facilitated by motivated patients taking ownership of their own recovery	“I think the patient has to subscribe and be up to participating in rehab otherwise it’s just going to be a kind of a non-starter really. So it really does need for me the patient to be on board with anything that’s going to happen in terms of rehabilitation to get them home.” (P8, nurse)
Beliefs about consequences	conceptualizing a model of rehabilitative practice	providing additional activities and resources motivates patients and helps engage them with rehabilitation	“Little things such as having music on in the day really helps to uplift their spirits which then had a knock-on effect in improving their physio outcome, so little things like having a radio on has a positive impact. (P20, nurse and clinical educator)
	competing professional and organisational goals	working towards organisational goals is particularly detrimental for more vulnerable patients	“I feel very uncomfortable about the drive to get people out of hospitals back to care homes without giving them more time in rehabilitation. And I think getting back to the care homes is the entirely appropriate thing to do from a medical point of view, but then they get very little physiotherapy after they’ve gone back and I do worry that we’re kind of consigning these people who are the most vulnerable patients that we have to additional dependence that they didn’t have before.” (P9, orthogeriatric consultant)
	engaging patients and their carers	lack of carers engagement is detrimental for optimal rehabilitation and not always reliable source of support, particularly for more vulnerable patients	"I think that’s been, probably the biggest challenge since Covid in the fact that we can’t get visitors in as freely, because I think, especially with some of our cognitively impaired patients, having a family member or a carer that they know well with them can have a massive impact on us being able to successfully rehab them" (P11, physiotherapist)
		carers and patients’ expectations impede recovery	“I think sometimes patients perceptions of what rehab is, is very different to what it actually is … I mean you’re literally talking about getting up and probably walking to the toilet or doing your bed or

		when not educated on what optimal rehabilitation involves	your chair exercises …. they're not going to do anything more than what they did before you know." (P17, OT)
		in the acute setting, better outcomes are achieved when patients and carers take ownership of rehabilitation	"Often that [discharge] might be only three/four days, sometimes it can obviously take a lot longer, but then a patient wouldn't be anywhere near being fully recovered or rehabilitated in three/four/five days, so then it becomes reliant predominantly on the patient and the family themselves to rehabilitate them." (P13, OT)
Memory, attention and decision processes	conceptualizing a model of rehabilitative practice	frequent discussions and organisational systems for patients notes help guide rehabilitation practices	"It [organisational system] just contains everything and it prompts … so it's really just an easy way of overseeing the patient's journey basically from like a multidisciplinary point of view … helps you to sort of identify if the cognitive problems that people have got are new, and if they are you can highlight it and discuss with the MDT and ask them to assess it further." (P13, OT)
	engaging teams in collaborative practice	written communication helps to guide health professionals' roles to work towards the same goals as a team	"We also have a communication board with what their functional ability is on that day, how they're mobilising and how they're transferring. And then the nursing staff on that ward will follow that advice and continue with the patient, for example when the patients get back in bed or they want to go to the toilet. We very much see the rehab role as an MDT really." (P3, OT)
Environmental context and resources	conceptualizing a model of rehabilitative practice	specialised professionals and services facilitate rehabilitation	"I think we've got a really good service to be honest, and I think part and parcel of that is the fact that we have specified rehabilitation unit, it really helps get our flow, and also we're a funded service, so we're very well supported managerially, and so you know, when we need equipment or we need help with discharge planning, I think we're well supported from that point of view." (P15, physiotherapist)
		improving post discharge care helps overarching rehabilitation goals in the acute setting	"I think if there was one thing I could make better it would probably to have more communication with the therapy teams who are

		looking after our patients once they leave our wards.” (P2, orthogeriatric consultant)
	fluctuation of financial resources and staffing, are main impediments to delivering optimal rehabilitation	“I think if we’re well staffed we can meet you know, and certainly and do pretty well with the audit and see people quickly, but I think as soon as we’re pressured certainly over the winter months it can be really difficult and if we don’t have the staff often it doesn’t become as high a priority as people that are actually needing to go home that day.” (P18, OT)
engaging teams in collaborative practice	healthcare professionals are better able to engage in collaborative practices in the absence of organisational constraints	“I think because it’s gotten much busier and probably a lot more for them [nursing staff] to do, I think they [nursing staff] just often find it easier just to [go] in and you know, quickly wash somebody rather than actually maybe spending the time with somebody saying you know, can you do this for yourself.” (P18, OT)
engaging patients and their carers	the hospital environment in itself is a challenge for rehabilitation, particularly for those with cognitive impairment	“Time constraints is huge, you tend to find your hip fracture patients need a lot of care and in the acute trauma wards it's just a very busy environment.” (P9, orthogeriatric consultant) “A lot of these patients are very cognitively impaired which obviously is a challenge and you put them in a single side room …They can't even recognise that they're in a hospital until the nurse comes in and tells them.” (P7, nurse)
	the covid-19 pandemic worsened patients’ outcomes as it limited carers involvement, activities and resources to motivate/engage patients	“On the ward as well physio-wise they do, they’ve not been able to at the moment with Covid again but they’d started to do group therapy which was quite good and patients were quite willing to get involved and quite enjoyed that.” (P4, nurse)

Social Influences	conceptualizing a model of rehabilitative practice	rehabilitation is strengthened when healthcare professionals are motivated, work well together, and support each other	Our therapists are brilliant, we've got a really great bunch who are, I think they're pretty well led and they're pretty focussed on what they're doing and they're really interested in getting things better… I guess being part of a team like this is really great and enormously encouraging and uplifting. (P2, orthogeriatric consultant)
	engaging teams in collaborative practice	health care professionals need to support and trust each other to deliver rehabilitation collaboratively	"It is about respecting the skills that each profession can give … which will benefit the patient longer term." (P9 OT)
Behavioural regulation	conceptualizing a model of rehabilitative practice	planning and communicating and planning with patients as soon as possible facilitates rehabilitation	"If you speak to people from the minute they come in they've got an idea of the pathway and how it's going to progress over the next, well, for the duration of their inpatient stay so it gives them something to think about and kind of work towards. So yeah, I think communication's probably the easiest way to improve it. (P7, nurse)
	engaging teams in collaborative practice	peer-feedback supports others to manage actions through audit or informal processes to extend skills	"We do a lot of reflective practice… a lot of in-service training. Anyone that's come up against a new piece of equipment we'll make half an hour to go through it. Anyone that has had a difficult conversation with a family member, okay, how did you deal with that? what did you do? let's do that next time, let's not do that. If it's a difficult conversation on the phone can someone listen in, can anyone provide any help." (P17, OT)

Table 3. Summary of multidisciplinary team perceived barriers and facilitators to acute rehabilitation service delivery after hip fracture according to domains of the Theoretical Domains Framework

Associated Theoretical Domain	**Facilitators**

Knowledge	Engaging with carers and patients as soon as possible to obtain information needed to deliver person-centred care, especially for more vulnerable patients Effective and frequent communication amongst health professionals to discuss patients optimal care and learn from each other
Skills	Training within and across disciplines involved in rehabilitation to better work collaboratively Educating patient and carers on best practices for rehabilitation, and to manage expectations
Social/professional role and identity	Supportive management and leadership supporting and providing healthcare professionals with the flexibility required to provide person-centred care Supportive management and leadership supporting improvement and development practices
Beliefs about capabilities	Healthcare professionals being able to decide on patients' rehabilitation journey to deliver person-centred care Healthcare professionals sharing responsibilities to ensure ongoing rehabilitation, whilst also supporting patients' independence and ownership of rehabilitation
Optimism; and Environmental context and resources	Providing additional activities to engage and improve patients' mood, and reinforce a positive attitude towards rehabilitation Adapting rehabilitation for more vulnerable patients
Belief about consequences	Patients taking ownership for their own recovery Communicating with patients and carers as soon as possible and throughout hospital stay to address concerns and reassure them Engaging carers in rehabilitation, especially with more vulnerable patients
Intentions	Sharing rehabilitation amongst health professionals, or advocating for patients as a team, to mitigate organisational constraints

Memory, attention and decision processes	Organisational systems and frequent meetings that remind and inform healthcare professionals of patients' assessments, rehabilitation goals and medical care
Social influences; and Social/professional role and identity	A positive culture where all healthcare professionals communicate and work well together, respecting and learning from each other
	Supportive management and shared leadership that encourages and promotes this positive culture
Behavioural regulation	Monitoring progress and identifying areas for improvement
	Barriers
Social/professional role and identity; and Belief about capabilities	Healthcare professionals' belief of their role in rehabilitation, characterised by distinct priorities and a reluctancy to step in other professionals' role
Belief about capabilities	Healthcare professionals not working collaboratively to supporting patients' independence
	Healthcare professionals not deciding over patients' rehabilitation journey
Belief about consequences	Lack of patients and carers engagement, or overprotective carers
	Patients and carers holding unrealistic expectations of rehabilitation
	Patients with cognitive impairment who cannot take ownership for their own rehabilitation
Optimism; and Environmental context and resources	Patients out of area and erratic linkages to community care
	Patients presenting with additional comorbidities
Intentions; and Social/professional role and identity	Prioritisation of patients to meet organisational goals that do not match healthcare professionals view of optimal rehabilitation and person-centred care

Goals; and Environmental context and resources	Organisational goals of reducing length of hospital stay not aligned with professionals' goals of delivering person-centred care, particularly for the more vulnerable patients
Environmental context and resources	Shortages, fluctuation of resources
	Lack of carers engagement and stopping additional activities to engage patients in rehabilitation, due to the covid-19 pandemic

201 ## Conceptualising a model of rehabilitative practice

202 This theme encompassed the perceptions of participants regarding the model of rehabilitation
203 promoted by their service. Rehabilitation as described by participants varied, suggesting
204 inconsistent protocolised approaches across sites despite similar hospital settings and
205 established key performance indicators. Despite variations in the descriptions of rehabilitation
206 practices, most healthcare professionals affirmed the specific practices of which they were part
207 was working for their setting (*n=16).* Participants also described a number of facilitators and
208 barriers to implementing their perceived optimal model of rehabilitation.

209 Across services, recurring factors perceived to facilitate optimal rehabilitation (by at least 3
210 participants) included: teams working well together and supportive consultants and senior
211 management who encouraged improvements to current rehabilitation services (*Social*
212 *Influences, Social/professional role and identity*), organisational systems for patient notes and
213 to prompt assessments, access to specialised professionals or services (e.g. orthogeriatricians,
214 dieticians, specialised wards), having responsibility over patients' rehabilitation journey (e.g.
215 deciding on referral pathway or discharge criteria), or providing activities to engage patients in
216 rehabilitation (*Memory, attention and processes, Environmental context and resources, Belief*
217 *about capabilities, Belief about consequences*):

218 *"I think our model works well because we're as a team we're quite interested in*
219 *improving care, not that other teams aren't, but we're just really enthusiastic and we're*
220 *quite eager. I think we've got the right people behind us that have the drive not only to*
221 *push these models forward but also to keep them going*." (P20, female, nurse and
222 clinical educator, 3.5 years of experience)

223 Less frequently reported facilitators of optimal rehabilitation (reported by at least 1-2
224 participants) included establishing a therapeutic relationship with a healthcare professional,
225 early communication and planning with patients, or strengthening post discharge care (e.g.,
226 follow patients up for outreach work or to gather feedback, links with community
227 rehabilitation) (*Belief about consequences, Behavioural regulation, Environmental context and*
228 *resources).* For example, one occupational therapist said:

229 "*Doing the split post with acute and community gives me the opportunity to .... give*
230 *advice and education to the staff on the acute ward in terms of how to improve*
231 *rehabilitation in the acute setting to help the more longer-term rehabilitation*" (P13,
232 female, occupational therapist, 12 years of experience)

233 Where individual participants thought rehabilitation fell below expectations, this often related
234 to organisational changes shaping the rehabilitation service in hospital, or a shortage and
235 fluctuation of resources such as financial provisions and staffing (*Environmental context and*
236 *resources*). There were various perceived causes for these shortages, for example, financial
237 constraints in funding more staff positions; disruptions due to the covid-19 pandemic;
238 difficulties in recruitment; getting cover for seven-day service and for staff leave. Participants
239 from different professional groups shared the view that they were left dissatisfied and aware
240 they were not providing the perceived optimal rehabilitation for patients.

241 "*I think the model's okay; I just wish we had more of it*." (P1, male, lead clinician
242 orthopaedic surgeon, 32 years of experience)

243 "*I don't know anywhere that's genuinely delivering seven days, a seven-day*
244 *orthogeriatric service, I'm absolutely certain you can't do it with two consultants*." (P2,
245 female, orthogeriatric consultant, 27 years of experience)

246 The impact of organisational issues (including staff shortages) was mitigated when healthcare
247 professionals worked closely together to deliver shared rehabilitation practices (*Intentions*).
248 This shared practice was considered to maximise opportunities for rehabilitation while
249 minimising unnecessary repetition of practice through crossing of professional boundaries.
250 This approach was highlighted by physiotherapists, occupational therapists and nurses and
251 most often implemented when rehabilitation was considered to encompass an array of care
252 processes inclusive of but not limited to mobility e.g., discharge planning, activities of daily
253 living including washing, dressing. For instance, one nurse commented:

254 "*They might not have funding to get more physiotherapists, but they've changed the way*
255 *they work … certainly it has improved over the last few years. They* [patients] *are not*
256 *getting their activity co-ordinator, their OT, and their physio all in one day and then*
257 *sitting dormant for five or six days, so it's spread out during the week and then nursing*
258 *staff are still doing rehab and walking people to the toilet."* (P7, female, nurse, 19 years
259 of experience)

260 Some healthcare professionals expressed concerns over a perceived change in the extent to
261 which care is patient centred, inhibiting optimal rehabilitation (*Optimism*). This shift was seen
262 to be due to two factors – a changing clinical presentation of the population, and erratic linkages
263 to community care. Health professionals highlighted patients are presenting with greater
264 complexity due to multimorbidity and increased levels of dependency. This complexity was

perceived to steer the focus towards planning for discharge which was not always person-centred (as some patients would benefit from more rehabilitation during the acute stay). Perceived erratic community linkages led to uncertainties over reliability of referrals following discharge and a lack of confidence in relaying to patients what they should expect from their ongoing rehabilitation (and a desire to retain in the acute setting to optimise recovery).

> "*I think for example because we're a tertiary service we get patients out of area, and I think that sometimes can be a barrier within itself when it comes to discharge planning, because we can't give them the same standard of care when it comes to going to rehabilitation*" (P15, female, trauma and orthopaedic physiotherapist, 7 years of experience)

> "*In my very short career I've seen a massive change in the patients' presentation, their ability and their sort of like functional decline really*" (P17, female, clinical lead occupational therapist, 7 years of experience)

Competing professional and organisational goals

Participants commonly commented on a mismatch between the flexibility required to adjust to individual needs (*Skills*) and the organisational goals for a standardised, pre-set model for rehabilitation after hip fracture (*Social/professional role and identity*). This was often reflected by healthcare professional goals of a good foundation for functional recovery on discharge, and organisational goals for discharge home as soon as possible (*Goals*). These competing goals sparked frustrations with participants emphasising the challenges of making a one-size-fits-all model work for the diverse scope of patients that they see with hip fracture (*Intentions*):

> "*There's a big push to get people home and do all the care, the acute rehab in the home, but you know, I've always argued that a patient has to be able to do a basic minimum*

288 *before they can get home.*" (P6, female, team lead orthopaedic physiotherapist, 21 years
289 of experience)

290 "*Any models are set up for the majority, not for the individual patient, despite everyone*
291 *aiming to be patient-centred*." (P9, female, orthogeriatric consultant, 18 years of
292 experience)

293 The majority of participants highlighted that more vulnerable patients, including those from
294 care homes and/or with cognitive impairment, were deemed to be more negatively affected by
295 organisational drivers for early hospital discharge. Indeed, such participants emphasised that
296 higher numbers of patients admitted from care homes were discharged with worse outcomes
297 that those admitted from their own home setting, whilst higher numbers of patients with
298 cognitive impairment transitioned to care homes than those without cognitive impairment
299 (*Beliefs about consequences*). These poorer patient outcomes were attributed to an
300 organisational imperative to quickly discharge patients and subsequent prioritisation based on
301 anticipated potential (*Social/professional role and identity*):

302 "*I feel very uncomfortable about the drive to get people out of hospitals back to care*
303 *homes without giving them more time in rehabilitation. And I think getting back to the*
304 *care homes is the entirely appropriate thing to do from a medical point of view, but*
305 *then they get very little physiotherapy after they've gone back, and I do worry that we're*
306 *kind of consigning these people who are the most vulnerable patients that we have to*
307 *additional dependence that they didn't have before*." (P9, female, orthogeriatric
308 consultant, 18 years of experience)

309 To mitigate the negative impact on more vulnerable patients, half of participants (n = 10) spoke
310 about making adaptations to care, such as asking family to join for rehabilitation, expediting
311 discharge to return patients to familiar surroundings, placing patients in enhanced care bays, or

312 holding dedicated recreational activities. Although there was limited discussion of the
313 outcomes of these strategies, such health professionals focus was on gaining patients' trust and
314 making them feel comfortable, working with family members, and adapting sessions to patients
315 needs and abilities (*Environmental context and resources, Optimism*). A few participants (n=
316 6) also advocated for healthcare professionals shifting away from organisational goals,
317 although this was influenced by team dynamics such as how well teams communicate, listen
318 and respect each other opinions, the degree of support and flexibility enabled by management
319 (*Intentions*). For example, one physiotherapist commented:

320 "*I think we've got enough people on the ward who are advocates for the patients, that*
321 *we can normally get the result we want if we're facing adversity from kind of the powers*
322 *that be, or from a discharge planning kind of aspect*." (P11, female, trauma and
323 orthopaedic physiotherapist, 17 years of experience)

324 Engaging teams in collaborative practice

325 This theme reflected participants' perceptions regarding their relationships with other
326 healthcare professionals and the expressed need to work collaboratively to maximise recovery
327 and likelihood of returning home following rehabilitation for patients with hip fracture. This
328 collaborative practice was facilitated by a positive team culture, underpinned by
329 communication, appropriate resources, and supportive leadership and management.

330 For most (n =17), the collaborative nature of their work was underscored in the discussion of
331 their own role and others' perceived role in rehabilitation (*Professional role and identity*).
332 Participants often commented on perceived unique and overlapping areas of their professional
333 practice and how the engagement of each health professional may vary depending on the needs
334 of an individual patient (*Skills*), for instance one consultant said:

335 "*For somebody who is normally very well or functional, drives a car, gets out and about*
336 *and they've literally tripped over something and broken a hip, then their rehabilitation*
337 *is largely going to be the physiotherapist because their needs, otherwise, aren't so*
338 *great. For somebody who is much frailer with cognitive impairment and delirium and*
339 *lives at home and has a lot of functional deficit, then actually the physiotherapist may*
340 *not have as much a role to play. It may be more occupational therapy and me and the*
341 *nursing staff*." (P9, female, orthogeriatric consultant, 18 years of experience)

342 Implementing this collaborative way of working was closely related to professional perceptions
343 of a positive team culture, commonly defined by cooperation, a smooth handover between
344 healthcare professionals, learning from each other on the job and freely voicing one's
345 professional opinion. As such, successful collaboration was underpinned by a mutual respect
346 and support across areas of practice. This was achieved via the shared leadership among senior
347 staff who instilled the cooperative atmosphere and actively promoted it to other professionals
348 and new members of the team (*Social influences, Social/Professional role and identity*):

349 "*We don't do one thing without asking the other first… for example I wouldn't mobilise*
350 *my patient without checking with my physio …what stages they are at with regards to*
351 *their mobility. I don't make assumptions on where my patient's going without speaking*
352 *to the orthogeriatricians*." (P20, female, nurse and clinical educator, 3.5 years of
353 experience)

354 The main feature underpinning a positive team culture was considered to be good
355 communication facilitated by multidisciplinary team meetings, bedside whiteboards, systems
356 for organizing staff notes, and/or clinical governance meetings. This intentionally or implicitly
357 worked to align the attitudes, values, and care outlook among healthcare professionals. Over
358 half of participants (n= 16) reported they engaged in almost daily multidisciplinary team

359 meetings or ward rounds where each professional commented on a patient's management from
360 their own professional perspective. This was an opportunity to reinforce positive team
361 dynamics and parity, for professionals to learn from each other, broaden their care perspective,
362 and modify their approach to accommodate this broader perspective (*Knowledge; memory,*
363 *attention, and decision processes*):

364 "*We also have a communication board with what their functional ability is on that day,*
365 *how they're mobilising and how they're transferring. And then the nursing staff on that*
366 *ward will follow that advice and continue with the patient, for example when the*
367 *patients get back in bed or they want to go to the toilet. We very much see the rehab*
368 *role as an MDT* [multidisciplinary team] *really. The nurses are very focussed on also*
369 *trying to improve someone's mobility*." (P3, female, occupational therapist, 25 years of
370 experience)

371 A positive team culture was also enabled by dedicating time to support shared learning within
372 and across professional groups *(Skills*). This learning included both formal (in-service training)
373 and informal (support to extend skills) training which was sometimes evaluated through e.g.,
374 audit to enable advocacy for additional resource (*Behavioural regulation*), but often not, as one
375 OT voiced:

376 "*We've given the empowerment, if you like, we don't have to get a patient up on day*
377 *zero, nursing staff will do it. So we've gone in with them, we've taught them, we've*
378 *given them the competencies, they're competent to do it, they take the same assessments*
379 *as we do and they can get them up and get them going*." (P5, female, team lead
380 orthopaedic physiotherapist, 21 years of experience)

381 Several participants (*n=7)* spoke about aspiring to these ways of working which more
382 effectively blurred perceived boundaries of professional roles to ensure that care and
383 rehabilitation was provided irrespective of issues with staffing (*Beliefs about capabilities*):

384 "*I think if it was a whole team approach of promoting independence it'd be much more*
385 *helpful, I think it's really difficult, like I've had a few instances this week where you*
386 *know, we're going in ourselves and the physio and say you know, you need to be doing*
387 *these on your own and then nursing staff are coming along and saying oh you know,*
388 *we'll wheel you to the toilet, it's just really not helpful*" (P18, female, occupational
389 therapist, 6.5 years of experience)

390 Implementing this in practice, however, was considered challenging, due to organisational
391 constraints such as shortages and heavy workloads, or professionals' perceptions and priorities
392 for their unique role in rehabilitation (*Environmental context and resources, Belief about*
393 *capabilities*). This viewpoint was typically illustrated by the occupational therapist below:

394 "*I think, traditionally the focus is more on, oh, okay, well physiotherapists get people*
395 *walking, occupational therapists deal with equipment, the nursing deal with continence*
396 *and nutrition, sort of nursing care and continence and things like that. Whereas,*
397 *actually, I think for everything to work there is an overlap between that. And to get the*
398 *best sort of model of care is where you can all truly work together and have sort of a*
399 *fluid role, in some respects, between the different professions."* (P12, female, team lead
400 trauma and orthopaedic physiotherapist, 13 years of experience)

401 Engaging patients and their carers

402 This theme related to professional attitudes towards working with patients and their families
403 during early rehabilitation. Patient engagement with rehabilitation and the degree of

404 involvement of relatives and carers were considered leading factors for successful
405 rehabilitation in hospital.

406 All participants perceived they adopted a person-centred approach to rehabilitation with a
407 commonly shared belief voiced that improved outcomes were achieved when patients take
408 ownership of their own recovery. Promoting this positive attitude in individual towards
409 rehabilitation was considered of particular importance in the context of limited physiotherapist
410 and/or occupational therapy staff resources (*Belief about consequences, Goals*). To reinforce
411 this individual responsibility of the patient, health care professionals often felt they needed to
412 present a unified front to support patients' independence, by reminding and facilitating this
413 approach to rehabilitation among different team members (*Belief about capabilities,*
414 *Social/professional role and identity)*. For instance, one consultant commented:

415 "*I explain to patients, part of your rehab isn't just the time that you spend with the*
416 *physio or with the OT, it's also the time walking out to the bathroom with the nurse or*
417 *the healthcare assistant or even by yourself is a part of your rehab because that's you*
418 *starting to use your muscles again and starting to practice your walking etc, that lots*
419 *of activity that you're doing in hospital without maybe another person being there with*
420 *you."* (P19, female, orthogeriatric consultant, 3.5 years of experience)

421 All healthcare professionals acknowledged that taking ownership for their early rehabilitation
422 after hip fracture would not be possible for all patients. In particular, the challenge of
423 supporting patients with cognitive impairment to engage in rehabilitation was identified across
424 all professional groups (*Belief about consequences*). A number of professionals regarding such
425 patients commented, "[they] don't fall in line with the model" but also acknowledged that there
426 was no alternate model of rehabilitation for these complex patients. Some indicated "the
427 responsibility is placed upon the people who work with them, the carers, the family to

428 encourage any kind of rehabilitation". Others acknowledged that care is delivered
429 "opportunistically" and can vary considerably from one professional and patient/carer-dyad to
430 the next.

431 Different healthcare professionals also acknowledged that such an approach to rehabilitation
432 may be challenging for the older patient population presenting with hip fracture in an acute
433 care setting, due to factors such as frailty, comorbidities, delirium, and/or disruptive and busy
434 hospital environments. Participants across all professional groups (n=5) found it helpful to
435 provide additional activities (group therapy, music, volunteers, support to dress in own clothes)
436 to engage patients with rehabilitation and support a positive attitude. These however relied
437 mainly on adequate resources and staff's extra time, and many of these additional activities had
438 been stopped because of the Covid-19 pandemic *(Environmental context and resources,*
439 *Optimism)*:

440 *On the ward as well physio-wise they do, they've not been able to at the moment with*
441 *Covid again but they'd started to do group therapy which was quite good and patients*
442 *were quite willing to get involved and quite enjoyed that."* (P4, female, nurse and
443 clinical educator, 23 years of experience*)*

444 Over half of participants (n = 12), representing different professional groups, described in detail
445 typical interactions with patients following hip fracture, which commonly included explaining
446 about care pathways, managing expectations, encouraging progress, and supporting a positive
447 individual attitude towards recovery (*Social/professional role and identity*). Several (n= 6) also
448 highlighted the importance of directly acknowledging the emotional burden presented by hip
449 fracture and subsequent need for supported rehabilitation to address both the physical and
450 psychological aspects of recovery (*Skills*). For example, one physiotherapist said:

> "*With the patient, it's managing their expectations. You know, it's a big, catastrophic event for them so it's more a case of sort of explaining to them, this is fine, you will recover from this, education, education, education. This is what we expect you to get back to and this is how long it's going to take*." (P5, female, team lead orthopaedic physiotherapist, 21 years of experience)

Several Healthcare professionals also highlighted the essential role of carers for successful rehabilitation. Communication with carers was perceived as paramount to obtain information about the patients' preferences and goals, particularly in the case of patients with cognitive impairment, to recruit them as reassuring and motivating presence during rehabilitation, and to arrange follow-up support after discharge. In the context of limited resources, carers engagement in rehabilitation were considered a key advantage (*Knowledge*, *Belief about consequences*). This belief was emphasised by most participants to be challenging during the Covid-19 pandemic where access to carers was limited to the perceived detriment of patients with hip fracture (*Environmental context and resource*).

> "*I think that's been, probably the biggest challenge since Covid in the fact that we can't get visitors in as freely, because I think, especially with some of our cognitively impaired patients, having a family member or a carer that they know well with them can have a massive impact on us being able to successfully rehab them*" (P11, female, trauma and orthopaedic physiotherapist, 17 years of experience)

Under pre-pandemic circumstances, different healthcare professionals perceived available support varied widely in part due to competing responsibilities of carers (e.g., work, and childcare commitments) and the feasibility of their support (*Belief about consequences*). Furthermore, certain family carers were sometimes a perceived barrier to patients' rehabilitation progress if they adopted an overprotective stance or had unrealistic expectations

475 for progress for their relative. A number of health professionals thus felt they needed to educate
476 carers on the likely milestones for rehabilitation (*Belief about consequences*) and how to
477 encourage progress in line with best practice (*Skills*).

478 *"You get patients and their carers complaining, they say well, they made them toilet*
479 *themselves or they watched them do this and they didn't provide care for them, they*
480 *just observed them or assisted them in doing an activity and they don't seem to*
481 *understand that that's the whole point of it is for us to enable them to re-enable and*
482 *rehab, so we now emphasise like the whole point of this is for them to improve their*
483 *skills and not for us to do stuff with them because they will start to lose their ability to*
484 *do this and that's not what the aim of this is, the aim is to get them back to near as their*
485 *baseline function as much as possible." (*P19, female, orthogeriatric consultant, 3.5
486 years of experience*)*

487 Discussion

488 Main findings

489 This study focused on multidisciplinary team healthcare professionals' perceptions on current
490 and optimal provision of acute rehabilitation, perceived facilitators and barriers to
491 implementation, and their implications for patient recovery using hip fracture as an example
492 population. Four key themes were identified during the analysis: *conceptualising a model of*
493 *rehabilitative practice, competing professional and organisational goals, engaging teams in*
494 *collaborative rehabilitation, and engaging patients and carers.* Themes were interpreted
495 through the lens of the TDF to identify perceived behaviours and implementation facilitators
496 and barriers to target for intervention.

497 In accordance with reported sources of variation, we found that the main determinants of 498 optimal rehabilitation were organisational features [17,18,23,24] and engagement of patients, 499 carers and the multidisciplinary team [17–24]. For these to be addressed, the presence of 500 supportive management and leadership often stood out as essential to promote a positive culture 501 where multidisciplinary teams, adequately trained and supported, communicated and worked 502 well together towards person-centred goals. Services worked towards these ideals in distinct 503 ways, in line with the variations in care provision found for hip fracture rehabilitation[16] and 504 the contextual variability evident across individual hospitals when implementing services [31].

505 Facilitators of optimal rehabilitation

506 Communication was perceived by healthcare professionals as the central implementation 507 facilitator of optimal provision of rehabilitation. This communication was noted at several 508 levels – with the patient and carer, among healthcare professionals, and with senior 509 management and leadership. Key features included 1) timing -early engagement of all 510 healthcare professionals, patients and carers to ensure appropriate understanding of prefracture 511 capability (*Knowledge*), common expectations for rehabilitation (*Skills*), and optimize 512 engagement (*Optimism, Environmental context and resource, Belief about consequences*), and 513 2) frequent communication -particularly among healthcare professionals to ensure close 514 monitoring of progress *(Knowledge*), shared learning (*Social influences, Social/professional* 515 *role and identity*) across disciplines, and consistent information and practices with patients. 516 Such early, frequent, and holistic approach to communication is supported by Health Education 517 England's recommendation for effective multidisciplinary teams working in health care [32], 518 as long as it is also used to better establish and deliver person-centred care. The newly proposed 519 key performance indicator 'zero' (assessing pain relief and admission to an appropriate ward 520 within 4 hours of presenting with a hip fracture)[16] represents an opportunity for acute

521 rehabilitation services to work towards this early engagement and potentially improve patient
522 and multidisciplinary team engagement.

523 Shared responsibility for rehabilitation (*Intention*) was also identified as a facilitator of optimal
524 provision of rehabilitation with multidisciplinary team training (*Social influences,*
525 *Social/professional role and identity, Skills*) to equip all members of the team (including
526 patients and carers) to deliver key components of rehabilitation irrespective of professional
527 background. The desire for other health professionals to aid with therapy and share
528 opportunities to rehabilitate hip fracture patients has been expressed in other studies [17,19].
529 Previous research has shown that patient benefits arise when nurses incorporate rehabilitation
530 practices into their work [33]. These collaborative practices, however, can be perceived as
531 intrusive to others professional roles, unrealistic in the face of heavy workloads and shortages,
532 and may be hampered by professional tensions and lack of adequate training [32,33]. These
533 organisational constraints often exacerbate silo working among health professionals working
534 in acute hospitals [34]. This way of working relies on environments that fosters a culture of
535 collaboration, where multidisciplinary teams respect, listen and trust each other, feel valued,
536 are appropriately trained, and have clarity over their responsibilities [32–35], a task that heavily
537 lies on senior management and leadership [32–35].

538 Hence unsurprisingly emphasised was the importance of supportive management and shared
539 leadership which stimulates communication through formal organisational structures such as
540 meetings (*Memory, attention and decision processes*), monitors progress and areas for
541 improvement (*Behavioural regulation*) and provides healthcare professionals flexibility to
542 adapt provision enabling person-centred care (*Belief about capabilities, Social/professional*
543 *role and identity*). Healthcare professionals have indicated elsewhere this facilitator as a main

544 driver of effectively implementing services for hip fracture patients in the acute setting [18],
545 and of promoting activities of daily living in hospitalised older adults [35].

546 Barriers to optimal rehabilitation

547 A commonly perceived implementation barrier among healthcare professionals in this study
548 was the limited patient and carer engagement, potentially due to complexity such as cognitive
549 impairment, but which leads on to unrealistic expectations for rehabilitation (Belief about
550 consequences). Particularly believed as detrimental for recovery outcomes was patients not
551 taking ownership for their own rehabilitation journey. The importance of this responsibility has
552 been priorly reported for this patient population [17,23]. In accordance, this and other studies
553 state health professional's role on informing, educating, and encouraging patients and carers
554 [17,19–24]. However, research suggests information and knowledge may not be enough for
555 older patients to self-motivate when hospitalised if organisational goals, rather than person-
556 centred goals, are the main focus of rehabilitation [36], as it often seems to be the case.
557 Strategies previously described to encourage patients' engagement are the provision of
558 alternative activities [20,21,24], communication skills training [19], goal setting [21], and
559 booklets to remind key information and exercises [21]. We found that strategies to engage
560 patients took the least priority and were inconsistent within and across settings, with most
561 relying on staff's initiatives and extra time. These also tended to focus on patients with
562 cognitive impairment, though patients who have broken their hip find it difficult to self-
563 motivate regardless of cognitive status [23].

564 Healthcare professionals working in silos, focusing on distinct priorities, and a reluctance to
565 step into other professionals' perceived roles (*Social/professional role and identity, Belief*
566 *about capabilities*), was another main perceived barrier which aligns with previous studies
567 [19,22,24]. Lack of coordination between multidisciplinary team members is related to delays

568 in mobilisation [34], which in turns relates to worse recovery and survival outcomes[37].
569 Strategies previously identified to engage multidisciplinary teams working with hip fracture
570 patients are training, effective communication, and visual reminders [17,18,20,23,35]. We also
571 observed vast variability in the way these strategies were implemented. There are nevertheless
572 potential patient benefits from blurring professionals' boundaries. A nurse-led orthogeriatric
573 care program for patients with hip fracture showed reductions in mortality by 3 and 12 months
574 in comparison to usual care [38], and involved joint work from geriatricians, surgeons,
575 physiotherapists, and occupational therapists to share rehabilitation responsibilities and
576 learning.

577 Organisational characteristics, most commonly voiced as an implementation barrier by
578 healthcare professionals, included protocol constraints limiting the need for flexibility to
579 enable patients centred care (*Belief about capabilities*), shortages and/or fluctuation of
580 resources, erratic links to community care limiting effective discharge planning
581 (*Environmental context and resources*), and limitations of the acute hospital environment with
582 insufficient resource to allow home visits during the hospital stay (*Environmental context and*
583 *resources*). The new proposed Key Performance Indicator 7 (follow patients up 120 days post
584 discharge to check on bone strengthening medication)[16] is an opportunity to improve referral
585 pathways and linkages with community services, a crucial gap repeatedly highlighted for
586 rehabilitation in the acute setting [17,23,24].

587 Organisational protocols that impede person-centred care have also been reported in hip
588 fracture rehabilitation [17,19]. From a broader rehabilitation perspective, physiotherapists and
589 occupational therapists talk about an ideal for their practice (holistic improvements that return
590 patients back to their pre-fracture functional status) that is inevitable unmet in the reality of the
591 acute setting [39], a conflict attributed in large part to the priority of adhering to organisational

592 standards [39]. Research describing the incompatibility of hip fracture rehabilitation models
593 for hospitalised patients with dementia [24] and those in a less severe state[23], also deem
594 organisational barriers that result in prioritisation of patients based on rehabilitation potential
595 as a main contributor [23,24]. Here, services were at least partly guided by key performance
596 indicators, which resulted in modifications to strengthen and improve services but were also a
597 reinforcer to the push to meet organisational goals rather than deliver person-centred care,
598 impacting more vulnerable patients to a greater extent. A systematic review evaluating the
599 experiences of healthcare professionals with implementation in acute settings highlighted
600 successful interventions had considered the individual culture and organisational barriers of
601 each site[31]. Furthermore, interventions were less likely to be reported as successful if they
602 were not aligned with established hospital standards, as professionals prioritised these[31]. In
603 line with our findings, this suggests that optimal rehabilitation interventions need to carefully
604 balance the importance of person-centred care and the need to meet organisational goals.

605 Wider implications of study findings

606 The focus of the current study was on rehabilitation after hip fracture as an example. Key
607 implementation facilitators shared among multidisciplinary team healthcare professionals were
608 communication, shared responsibility for rehabilitation, and supportive management and
609 shared leadership. Key implementation barriers included absence of patient and carer
610 engagement, healthcare professionals working in silos, and organisational barriers. While we
611 focused on hip fracture the facilitators (and mechanisms to implement) and barriers (and
612 mechanisms to overcome) are likely similar across admitting diagnoses for older adults. This
613 is evidenced by studies on implementation of stroke care guidelines [40,41] mobility and
614 functional decline for a variety of diagnoses in hospitalised older adults [34,42] rehabilitation
615 for critically ill patients[43], and a review of hospital-based interventions [31].

616 ## Limitations

617 We employed a convenience sampling approach with 20 participants working in 15 hospitals
618 in the UK. This may have led to overstating perceived barriers and/or facilitators as some
619 participants were working at the same hospital. We sought to capture a multidisciplinary
620 perspective on rehabilitation however, participation was dominated by physiotherapists and
621 occupational therapists (n =14), those with at least 10-years of experience (n = 14), and who
622 were female (n = 18) despite efforts to recruit other professional groups from multiple
623 sources. This may reflect a perception that rehabilitation is a therapist's role opposed to a care
624 structure/process[17]. This may lead to an imbalance of the perspectives of healthcare
625 professionals more broadly limiting generalisability of the findings. Future research may
626 focus on under-represented groups (in terms of profession, experience, and sex) to broaden
627 our understanding of optimal acute rehabilitation from the perspective of more groups.
628 Moreover, alternative sampling strategies, such as snowball sampling, a procedure commonly
629 used to increase the sample diversity of studies among 'difficult-to-reach'
630 populations[44]may complement future research recruitment strategies. Finally, the study
631 captured participants working in England and Scotland and the results may not be translated
632 more widely to other settings where e.g., length of acute hospital stay may vary.

633 ## Conclusions

634 Optimal rehabilitation in the acute setting requires effective communication and involvement
635 of multidisciplinary teams, patients, and carers, to engage in a collaborative model of
636 rehabilitation where individuals work towards the same person-centred goals. This
637 collaborative way of working can then also ameliorate some of the organisational constraints.
638 However, at the same time, organisational barriers (e.g. lack of resources and the need to meet
639 organisational standards) can exacerbate silo working and poor patient engagement. There is

640 variability in the way acute rehabilitation services work to attain these aims, but important
641 facilitators to implement optimal acute rehabilitation services after hip fracture are the
642 provision of adequate resources and supportive management and leadership characteristics
643 within multidisciplinary healthcare professional teams.

644 Acknowledgements

645 We would like to thank the participants who gave up their time to take part in the interviews.

646 References

647 1. World Health Organization. Rehabilitation in Health Systems. World Health
648 Organization [Internet]. 2017 [cited 2021 Nov 30];92. Available from:
649 https://apps.who.int/iris/handle/10665/254506

2. NHS England. Commissioning Guidance For Rehabilitation. 2016 [cited 2021 Nov 30];(04919):159. Available from: https://www.england.nhs.uk/publication/commissioning-guidance-for-rehabilitation/

3. Morris JH, Bernhardsson S, Bird ML, Connell L, Lynch E, Jarvis K, et al. Implementation in rehabilitation: a roadmap for practitioners and researchers. Disabil Rehabil [Internet]. 2020 Oct 22 [cited 2021 Dec 8];42(22):3265–74. Available from: https://pubmed.ncbi.nlm.nih.gov/30978129/

4. NHS. NHS Long Term Plan [Internet]. 2019 [cited 2021 Dec 1]. Available from: https://www.longtermplan.nhs.uk/online-version/

5. NHS Benchmarking Network. National Audit of Intermediate Care Report [Internet]. Manchester; 2013. Available from: https://www.scie-socialcareonline.org.uk/national-audit-of-intermediate-care-report-2013/r/a11G0000002XaeKIAS

6. Longley V, Peters S, Swarbrick C, Bowen A. What factors affect clinical decision-making about access to stroke rehabilitation? A systematic review. Clin Rehabil [Internet]. 2019 Feb 1 [cited 2021 Dec 9];33(2):304. Available from: /pmc/articles/PMC6348456/
7. Department of Health & Social Care. Hospital discharge and community support: policy and operating model [Internet]. 2021 [cited 2021 Dec 1]. Available from: https://www.gov.uk/government/publications/hospital-discharge-service-policy-and-operating-model/hospital-discharge-service-policy-and-operating-model
8. Wade D. Complexity, case-mix and rehabilitation: The importance of a holistic model of illness. Clin Rehabil [Internet]. 2011 May 4 [cited 2021 Dec 1];25(5):387–95. Available from: https://journals.sagepub.com/doi/10.1177/0269215511400282?url_ver=Z39.88-2003&rfr_id=ori%3Arid%3Acrossref.org&rfr_dat=cr_pub++0pubmed
9. ten Hove R, Johansen A, Liddicoat M, Boulton C. The national physiotherapy hip fracture sprint audit (PHFSA). Physiotherapy. 2017 Dec;103:e108–9.
10. Salman A, Doherty P. To what extent is the variation in cardiac rehabilitation quality associated with patient characteristics? BMC Health Serv Res [Internet]. 2019 Jan 3 [cited 2021 Dec 1];19(1):1–8. Available from: https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-018-3831-1
11. National Audit Office. Discharging older people from acute hospitals. (HC 18 SESSION 2016-17). [Internet]. 2016 [cited 2021 Dec 1]. Available from: https://publications.parliament.uk/pa/cm201617/cmselect/cmpubacc/76/7606.htm
12. Kearney RS, Parsons N, Underwood M, Costa ML. Achilles tendon rupture rehabilitation: a mixed methods investigation of current practice among orthopaedic surgeons in the United Kingdom. Bone Joint Res [Internet]. 2015 Apr 1 [cited 2021 Dec 1];4(4):65. Available from: /pmc/articles/PMC4448123/
13. National Institute for Health and Clinical Excellence (NICE). CMG46: Management of hip fracture in adults. [Internet]. 2012 [cited 2021 Nov 30]. Available from: https://www.nice.org.uk/guidance/cg124
14. Royal College of Physicians. National Hip Fracture Database (NHFD) annual report 2019 [Internet]. London. 2019 [cited 2021 Dec 1]. Available from:

https://www.rcplondon.ac.uk/projects/outputs/national-hip-fracture-database-nhfd-annual-report-2019

15. Penrod JD, Litke A, Hawkes WG, Magaziner J, Koval KJ, Doucette JT, et al. Heterogeneity in hip fracture patients: age, functional status, and comorbidity. J Am Geriatr Soc [Internet]. 2007 Mar [cited 2021 Nov 30];55(3):407–13. Available from: https://pubmed.ncbi.nlm.nih.gov/17341244/

16. Royal College of Physicians. Facing new challenges - The National Hip Fracture Database (NHFD) report on 2020 [Internet]. 2020 [cited 2021 Dec 9]. Available from: https://www.nhfd.co.uk/20/hipfractureR.nsf/docs/2021Report

17. Volkmer B, Sadler E, Lambe K, Martin FC, Ayis S, Beaupre L, et al. Orthopaedic physiotherapists' perceptions of mechanisms for observed variation in the implementation of physiotherapy practices in the early postoperative phase after hip fracture: a UK qualitative study. Age Ageing [Internet]. 2021 Nov 10 [cited 2021 Nov 30];50(6):1961–70. Available from: https://academic.oup.com/ageing/article/50/6/1961/6310129

18. Drew S, Judge A, May C, Farmer A, Cooper C, Javaid MK, et al. Implementation of secondary fracture prevention services after hip fracture: a qualitative study using extended Normalization Process Theory. Implement Sci [Internet]. 2015 Apr 23 [cited 2021 Nov 30];10(1). Available from: https://pubmed.ncbi.nlm.nih.gov/25903563/

19. Jensen CM, Santy-Tomlinson J, Overgaard S, Wiil UK, Jakobsen PR, Smith AC, et al. Empowerment of whom? The gap between what the system provides and patient needs in hip fracture management: A healthcare professionals' lifeworld perspective. Int J

Orthop Trauma Nurs [Internet]. 2020 Aug 1 [cited 2021 Nov 30];38. Available from: https://pubmed.ncbi.nlm.nih.gov/32595058/

20. Leland NE, Lepore M, Wong C, Chang SH, Freeman L, Crum K, et al. Delivering high quality hip fracture rehabilitation: the perspective of occupational and physical therapy practitioners. Disabil Rehabil [Internet]. 2018 Mar 13 [cited 2021 Nov 30];40(6):646–54. Available from: https://pubmed.ncbi.nlm.nih.gov/28110561/

21. Ropke A, Lund K, Thrane C, Juhl C, Morville A le. Developing an individualised cross-sectoral programme based on activities of daily living to support rehabilitation of older adults with hip fracture: a qualitative study. BMJ Open [Internet]. 2021 Jun 1 [cited 2021 Nov 30];11(6):e044539. Available from: https://bmjopen.bmj.com/content/11/6/e044539

22. Haslam-Larmer L, Donnelly C, Auais M, Woo K, DePaul V. Early mobility after fragility hip fracture: a mixed methods embedded case study. BMC Geriatr [Internet]. 2021 Dec 1 [cited 2021 Nov 30];21(1):1–14. Available from: https://bmcgeriatr.biomedcentral.com/articles/10.1186/s12877-021-02083-3

23. Williams NH, Roberts JL, Ud Din N, Charles JM, Totton N, Williams M, et al. Developing a multidisciplinary rehabilitation package following hip fracture and testing in a randomised feasibility study: Fracture in the Elderly Multidisciplinary Rehabilitation (FEMuR). Health Technol Assess [Internet]. 2017 [cited 2021 Dec 1];21(44):1–527. Available from: https://pubmed.ncbi.nlm.nih.gov/28836493/

24. Hall A, Watkins R, Lang I, Endacott R, Goodwin V. The experiences of physiotherapists treating people with dementia who fracture their hip. BMC Geriatr

[Internet]. 2017 Apr 20 [cited 2021 Dec 9];17(1). Available from: https://pubmed.ncbi.nlm.nih.gov/28427333/

25. Cane J, O'Connor D, Michie S. Validation of the theoretical domains framework for use in behaviour change and implementation research. Implementation Science [Internet]. 2012 Apr 24 [cited 2021 Nov 30];7(1):1–17. Available from: https://implementationscience.biomedcentral.com/articles/10.1186/1748-5908-7-37

26. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. Int J Qual Health Care [Internet]. 2007 Dec [cited 2021 Nov 30];19(6):349–57. Available from: https://pubmed.ncbi.nlm.nih.gov/17872937/

27. Saunders B, Sim J, Kingstone T, Baker S, Waterfield J, Bartlam B, et al. Saturation in qualitative research: exploring its conceptualization and operationalization. Qual Quant [Internet]. 2018 Jul 1 [cited 2021 Nov 30];52(4):1893. Available from: /pmc/articles/PMC5993836/

28. Stratton SJ. Population Research: Convenience Sampling Strategies. Prehosp Disaster Med [Internet]. 2021 Aug 1 [cited 2021 Nov 30];36(4):373–4. Available from: https://www.cambridge.org/core/journals/prehospital-and-disaster-medicine/article/population-research-convenience-sampling-strategies/B0D519269C76DB5BFFBFB84ED7031267

29. Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol. 2006;3(2):77–101.

30. Ziebland S, McPherson A. Making sense of qualitative data analysis: an introduction with illustrations from DIPEx (personal experiences of health and illness). Med Educ [Internet]. 2006 May 1 [cited 2021 Nov 30];40(5):405–14. Available from: https://onlinelibrary.wiley.com/doi/full/10.1111/j.1365-2929.2006.02467.x

31. Geerligs L, Rankin NM, Shepherd HL, Butow P. Hospital-based interventions: A systematic review of staff-reported barriers and facilitators to implementation processes. Implementation Science [Internet]. 2018 Feb 23 [cited 2022 Mar

20];13(1):1–17. Available from: https://implementationscience.biomedcentral.com/articles/10.1186/s13012-018-0726-9

32. Health Education England. Multidisciplinary Team (MDT) Toolkit [Internet]. 2021 [cited 2022 Mar 20]. Available from: https://www.hee.nhs.uk/our-work/workforce-transformation/multidisciplinary-team-mdt-toolkit

33. Long AF, Kneafsey R, Ryan J. Rehabilitation practice: challenges to effective team working. Int J Nurs Stud [Internet]. 2003 [cited 2022 Mar 20];40(6):663–73. Available from: https://pubmed.ncbi.nlm.nih.gov/12834931/

34. Stutzbach J, Jones J, Taber A, Recicar J, Burke RE, Stevens-Lapsley J. Systems Approach Is Needed for In-Hospital Mobility: A Qualitative Metasynthesis of Patient and Clinician Perspectives. Arch Phys Med Rehabil [Internet]. 2021 May 1 [cited 2022 Mar 20];102(5):984–98. Available from: http://www.archives-pmr.org/article/S0003999320309382/fulltext

35. Boltz M, Capezuti E, Shabbat N. Nursing staff perceptions of physical function in hospitalized older adults. Appl Nurs Res [Internet]. 2011 Nov [cited 2022 Mar 20];24(4):215–22. Available from: https://pubmed.ncbi.nlm.nih.gov/20974088/

36. Selman LE, Daveson BA, Smith M, Johnston B, Ryan K, Morrison RS, et al. How empowering is hospital care for older people with advanced disease? Barriers and facilitators from a cross-national ethnography in England, Ireland and the USA. Age Ageing [Internet]. 2017 [cited 2022 Mar 20];46(2):300–9. Available from: https://research-information.bris.ac.uk/en/publications/how-empowering-is-hospital-care-for-older-people-with-advanced-di

37. Goubar A, Martin FC, Potter C, Jones GD, Sackley C, Ayis S, et al. The 30-day survival and recovery after hip fracture by timing of mobilization and dementia: A UK DATABASE STUDY. Bone and Joint Journal [Internet]. 2021 Jul 1 [cited 2022 Mar 20];103 B(7):1317–24. Available from: https://online.boneandjoint.org.uk/doi/abs/10.1302/0301-620X.103B7.BJJ-2020-2349.R1

38. van Leendert JAA, Linkens AEMJH, Poeze M, Pijpers E, Magdelijns F, ten Broeke RHM, et al. Mortality in hip fracture patients after implementation of a nurse practitioner-led orthogeriatric care program: results of a 1-year follow-up. Age Ageing [Internet]. 2021 Sep 11 [cited 2022 Mar 20];50(5):1744–50. Available from: https://academic.oup.com/ageing/article/50/5/1744/6168881

39. Bradley G, Baker K, Bailey C. The meaning of rehabilitation: a qualitative study exploring perspectives of occupational therapists and physiotherapists working with older people in acute care. https://doi.org/101080/0963828820191697762 [Internet]. 2019 [cited 2022 Mar 20];43(16):2295–303. Available from: https://www.tandfonline.com/doi/abs/10.1080/09638288.2019.1697762

40. Donnellan C, Sweetman S, Shelley E. Implementing clinical guidelines in stroke: a qualitative study of perceived facilitators and barriers. Health Policy [Internet]. 2013 Aug [cited 2022 Mar 20];111(3):234–44. Available from: https://pubmed.ncbi.nlm.nih.gov/23643101/

41. Taylor E, McKevitt C, Jones F. Factors shaping the delivery of acute inpatient stroke therapy: a narrative synthesis. J Rehabil Med [Internet]. 2015 Feb 1 [cited 2022 Mar 21];47(2):107–19. Available from: https://pubmed.ncbi.nlm.nih.gov/25437308/

42. Kavanagh AY, O'Brien LJ, Maloney SR, Osadnik CR. Barriers and facilitators to adopting functional maintenance initiatives for acutely hospitalised older adults. Disabil Rehabil [Internet]. 2020 Dec 17 [cited 2022 Mar 21];42(26):3808–15. Available from: https://pubmed.ncbi.nlm.nih.gov/31079499/

43. Parry SM, Knight LD, Connolly B, Baldwin C, Puthucheary Z, Morris P, et al. Factors influencing physical activity and rehabilitation in survivors of critical illness: a systematic review of quantitative and qualitative studies. Intensive Care Med [Internet]. 2017 Apr 1 [cited 2022 Mar 21];43(4):531–42. Available from: https://pubmed.ncbi.nlm.nih.gov/28210771/

44. Kirchherr J, Charles K. Enhancing the sample diversity of snowball samples: Recommendations from a research project on anti-dam movements in Southeast Asia. PLoS One [Internet]. 2018 Aug 1 [cited 2022 Sep 1];13(8). Available from: /pmc/articles/PMC6104950/

650 # Supporting information

651 S1 Table. Questions and prompts mapped to the Theoretical Domains Framework domains
652 and constructs

653 S2 Appendix I. Audit trail of phases of qualitative data analysis process with examples.

Supporting Information Table 1. Questions and prompts mapped to the Theoretical Domains Framework domains and constructs

TDF Domains and definition	TDF constructs	Questions and prompts [Constructs]
Knowledge (An awareness of the existence of something)	Knowledge of condition/scientific rationale Procedural knowledge Knowledge of task environment Knowledge of scientific rationale	**Q1** Please could you tell me about your role in rehabilitation after hip fracture? **Q2** What types of patients do you see with hip fracture? Prompt: how do you work with these/different patients? **Q3a** What is the current model for rehabilitation for patients after hip fracture in your hospital? [Procedural knowledge, knowledge of task environment, knowledge of scientific rationale] Prompt: what is the rationale for the current model? Prompt: How feasible is it for you to implement this model? / What are the facilitators and barriers to successful delivery of the model? e.g. Patient facilitators/barriers? e.g., Resource facilitators/barriers? / How do you manage working within the model? Q3b What are your thoughts on this model? Prompt: How confident are you in your hospitals model? / How confident are you that you can deliver the model effectively? *Positive / Facilitators* Prompt: What in particular makes the model work so well? Prompts: What helps you and your colleagues to successfully deliver the model? Prompt: What advice would you give to another hospital hoping to make changes? *Negative / Barriers* Prompt: What challenges do you face when implementing this model? / Can you provide an example of a situation where it was challenging to deliver the model effectively? Does this occur often? Prompt: How would you change the model? / What have you done to change the model? How do you overcome this challenge? How have you addressed this issue? Prompt: Are you aware of models in other hospitals that you would like to implement at your hospital? *Other Staff* Prompt: How do you think your thoughts compare to other healthcare professionals at your hospital? / To what extent do you think your colleagues share your views? Prompt: To what extent do you believe your model is interdisciplinary? Can you provide some examples? Prompt: To what extent do you think the responsibility for successful rehabilitation falls on some professionals more than others? Can you provide some detail why?

		Prompt: How do you think your thoughts compare to other healthcare professionals at your hospital? / To what extent do you think your colleagues share your views? *Monitoring Model Outcomes* Prompt: How do you keep up to date with changes in aspects of care delivery for patients after hip fracture? Prompt: How do you monitor success? Prompt: What changes could you implement? **Q4** To what extent is the model provided for all patients consistently? OR How does care vary for different types of patients / on patients depending on how they present OR How do you accommodate for different patient need? Prompt: How does your model accommodate for patients with hip fracture and cognitive impairment? / How confident are you your hospitals model accommodates / can be delivered effectively for those with cognitive impairment? Prompt: How feasible is it for you to implement this model with patients? / What challenges do you face when implementing this model for all patients? *Training* Prompt: What training is available at your site for healthcare professionals working with patients with hip fracture? Is this training formal or informal? What is involved in 'X' training? *Change* Prompt: How would you change the model? / What could be put in place to change the model if needed? **Q5** What do you think the role of other healthcare professionals is in rehabilitation after hip fracture? [Procedural knowledge] Prompt: How do you see your role fitting in within the team? / How does your role differ from other healthcare professionals in the team? / How do you think other healthcare professionals would describe your role? Prompt: What is involved in your role + what are the facilitators and barriers to this? Prompt: What aspects of acute rehabilitation do you identify as being part of your role as a …? Prompt: How do you interact with other healthcare professionals in the management of patients with hip fracture?
Skills (An ability or proficiency acquired through practice)	Skills Skills development Competence Ability Interpersonal skills	**Q2** Can you describe the types of patients that you see with hip fracture? Prompt: how do you work with these/different patients? **Q3b** What are your thoughts on this model? [Ability, Practice] Prompt: How do you manage working within the model?

	Practice Skill assessment	**Q4** To what extent is the model provided for all patients consistently? [Competence, ability, practice] Prompt: What training is available at your site for healthcare professionals working with patients with hip fracture? **Q5** What do you think the role of other healthcare professionals is in rehabilitation after hip fracture? [Interpersonal skills] Prompt: How do you interact with other healthcare professionals in the management of patients with hip fracture? **Q6** What do you think the role of patients and their carers is in rehabilitation after hip fracture? [Professional boundaries] Prompt: How do you interact with carers in the management of patients with hip fracture? Prompt: What do you consider a reasonable contribution to expect from a caregiver?
Social/ Professional role and identity (A coherent set of behaviours and displayed personal qualities of an individual in a social or work setting)	Professional identity Professional role Social identity Identity Professional boundaries Professional confidence Group identity Leadership Organizational commitment	**Q1** Please could you tell me about your role in rehabilitation after hip fracture? [Professional role, identity] **Q4** To what extent is the model provided for all patients consistently? [Professional confidence] Prompt: How does your role accommodate for patients with hip fracture and cognitive impairment? **Q5** What do you think the role of other healthcare professionals is in rehabilitation after hip fracture? [Professional boundaries, group identity, organisational commitment] Prompt: How do you see your role fitting in within the team? Prompt: How does your role differ from other healthcare professionals in the team? Prompt: What are your thoughts on professional boundaries for multidisciplinary team members? (crossover of scope of practice) **Q6** What do you think the role of patients and their carers is in rehabilitation after hip fracture? [Professional boundaries] Prompt: How do you interact with carers in the management of patients with hip fracture? Prompt: What do you consider a reasonable contribution to expect from a caregiver?
Beliefs about capabilities (Acceptance of the truth, reality or validity about an ability, talent or facility that a person can put to constructive use)	Self-confidence Perceived competence Self-efficacy Perceived behavioural control Beliefs Self-esteem Empowerment Professional confidence	**Q1** Please could you tell me about your role in rehabilitation after hip fracture? [Beliefs] **Q3b** What are your thoughts on this model? [Perceived behavioural control, Professional Confidence] Prompts: What helps you and your colleagues to successfully deliver the model? Prompt: How confident are you in your hospitals model? Prompt: How confident are you that you can deliver the model effectively?

		Prompt: Can you provide an example of a situation where it was challenging to deliver the model effectively? Does this occur often? **Q4** To what extent is the model provided for all patients consistently? [Perceived behavioural control, professional confidence] Prompt: How confident are you your hospitals model accommodates for those with cognitive impairment? Prompt: How confident are you that you can deliver the model effectively for patients with cognitive impairment?
Optimism (The confidence that things will happen for the best or that desired goals will be attained)	Optimism Pessimism Unrealistic optimism Identity	**Q3b** What are your thoughts on this model? [optimism, pessimism, unrealistic optimism] Prompt: How do you think your thoughts compare to other healthcare professionals at your hospital? **Q4** To what extent is the model provided for all patients consistently? [optimism, pessimism, unrealistic optimism] Prompt: How do you think your thoughts compare to other healthcare professionals at your hospital?
Beliefs about consequences (Acceptance of the truth, reality, or validity about outcomes of a behaviour in a given situation)	What are the benefits/negative aspects of the behaviour (model)? Beliefs Outcome expectancies Characteristics of outcome expectancies Anticipated regret Consequences	**Q3b** What are your thoughts on this model? [Beliefs, outcome expectancies, characteristics of outcome expectancies, anticipated regret, consequences] Prompt: What in particular makes the model work so well? Prompt: What advice would you give to another hospital hoping to make changes? Prompt: What has been done to change the model? Prompt: How would you change the model? Prompt: What have you done to change the model? Prompt: Are you aware of models in other hospitals that you would like to implement at your hospital? **Q4** To what extent is the model provided for all patients consistently? [Beliefs, outcome expectancies, characteristics of outcome expectancies, anticipated regret, consequences] Prompt: How would you change the model?
Reinforcement (Increasing the probability of a response by arranging a dependent relationship, or contingency, between the response and a given stimulus)	Rewards (proximal/distal, valued/not valued, probable/improbable) Incentives Punishment Consequents Reinforcement Contingencies Sanctions	**Q4** To what extent is the model provided for all patients consistently? [reinforcement, consequents, contingencies] Prompt: What could be put in place to change the model if needed?
Intentions	Stability of intentions	**Q3b** What are your thoughts on this model? [Stability of intentions] Prompt: How have your thoughts on the model changed over time?

(A conscious decision to perform a behaviour or a resolve to act in a certain way	Stages of change model Transtheoretical model and stages of change	Prompt: Have you always felt this way about the model? **Q4** To what extent is the model provided for all patients consistently? [Stability of intentions] Prompt: Have you always felt this way about the model?
Goals (Mental representations of outcomes or end states that an individual wants to achieve)	Goals (distal/proximal) Goal priority Goal/target setting Goals (autonomous/controlled) Action planning Implementation intention	**Q3a** What is the current model for rehabilitation for patients after hip fracture in your hospital? [Implementation intention] Prompt: How feasible is it for you to implement this model? **Q3b** What are your thoughts on this model? [Goals/target setting, implementation intention] Prompt: How feasible is it for you to implement this model? Prompt: What challenges do you face when implementing this model? **Q4** To what extent is the model provided for all patients consistently? [Implementation intention] Prompt: How feasible is it for you to implement this model? **Q7** What do you believe is the goal of the model of rehabilitation at your hospital? [Goals] Prompt: From the perspective of hospital management? And/or healthcare professionals? How do you feel about these goals?
Memory, attention, and decision processes (The ability to retain information, focus selectively on aspects of the environment and choose between two or more alternatives)	Is X something they usually do? Will they think to do X? Are there reminders in place? Memory Attention Attention Control Decision making Cognitive overload/tiredness	**Q3b** What are your thoughts on this model? [memory] Prompt: How do you keep up to date with changes in aspects of care delivery for patients after hip fracture?
Environmental context and resources (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)	Are there sufficient resources to do the behaviour? If not, what is missing? Environmental stressors Resources/material resources Organizational culture/climate Salient events/critical incidents Person x environment interaction Barriers and facilitators	**Q3b** What are your thoughts on this model? [Environmental stressors, resources/material resources, organisational culture/climate, person x environment interaction, barriers and facilitators] Prompt: How feasible is it for you to implement this model? Prompt: What challenges do you face when implementing this model? Prompt: What are the facilitators and barriers to successful delivery of the model? **Q4** To what extent is the model provided for all patients consistently? [Environmental stressors, resources/material resources, organisational culture/climate, person x environment interaction, barriers and facilitators] Prompt: How feasible is it for you to implement this model? Prompt: What challenges do you face when implementing this model for all patients?

Social influences (Those interpersonal processes that can cause individuals to change their thoughts, feelings, or behaviours)	Who influences the decision to perform the behaviour? Social pressure Social norms Group conformity Social comparisons Group norms Social support Power Intergroup conflict Alienation Group identity Modelling	**<u>Q3b</u>** What are your thoughts on this model? [Social norms, group conformity, social comparisons, group norms, social support, power, intergroup conflict, alienation, group identity] Prompt: To what extent do you think your colleagues share your views? Prompt: To what extent do you believe you model is interdisciplinary? Can you provide some examples? **<u>Q4</u>** To what extent is the model provided for all patients consistently? [Social norms, group conformity, social comparisons, group norms, social support] Prompt: To what extent do you think your colleagues share your views? **<u>Q5</u>** What do you think the role of other healthcare professionals is in rehabilitation after hip fracture? [Group conformity, group norms, social support, power, intergroup conflict, alienation, group identity] Prompt: How do you think other healthcare professionals would describe your role? **<u>Q6</u>** What do you think the role of patients and their carers is in rehabilitation after hip fracture? [Social support] Prompt: What do you consider a reasonable contribution to expect from a caregiver?
Emotions (A complex reaction pattern, involving experiential, behavioural, and physiological elements, by which the individual attempts to deal with a personally significant matter or event)	How does emotion affect the behaviour? Is X stressful? Fear Anxiety Affect Stress Depression Positive/negative affect Burn-out	**<u>Q3b</u>** What are your thoughts on this model? [Stress, burn-out] Prompt: How feasible is it for you to implement this model for all patients? Prompt: To what extent do you think the responsibility for successful rehabilitation falls on some professionals more than others? Can you provide some detail why? **<u>Q8</u>** What are the emotional impacts of delivering your hospital model? [Stress, burn-out, Positive/negative affect] Prompt: How do you cope with the emotional impact / What support is available to you?
Behavioural regulation (Anything aimed at managing or changing objectively observed or measured actions)	What steps are taken to ensure behaviour is performed? Self-monitoring Breaking habit Action planning	**<u>Q3b</u>** What are your thoughts on this model? [Self-monitoring, action planning] Prompt: How do you monitor success? Prompt: What changes could you implement? **<u>Q4</u>** To what extent is the model provided for all patients consistently? [Self-monitoring, action planning] Prompt: How do you monitor success? Prompt: What changes could you implement?

TDF: Theoretical Domains Framework

Supporting Information Appendix I

Audit trail of phases of qualitative data analysis process with examples.

Phase 1: Initial and axial coding from the qualitative data in NVivo (version 12)

Codes from the data:

Advocacy (for patients, resources)
Barriers to implementation
    Barriers external to the health system
Communication
With patients and carers
With team, other services in community
Ways of communicating, tools, meetings
Congruence of opinion
Customization of care to the patient
Emotional impact to staff
Family and carers
    Education, expectations from rehabilitation
Feasibility of model for applying to all patients
Goals of model
Improvements
    Improvements external to the health system
Managing comorbidities (cognitive impairment; other health conditions)
Model outline
Model rationale
Monitoring success/ outcomes (e.g. audits)
Leadership
Opinion on model
Strengths of model
Weaknesses of model
Other staff's role
Own role
Pandemic
Patients
    Patient engagement
    Environment of hospital and resources
    Patients for whom model does not work
    Education, expectations from rehabilitation
Relations with other staff
Linkages (outside one's immediate team; referrals; community care; charities)
Team culture (work climate)
Team motivation
Teamwork (ways of working together with other staff)
Resources in setting
Resources to help more vulnerable patients
Provision over the weekend
    Resources outside the health system (charities, social care etc.)
Responsibilities
Systemic problems (coming from the way the health system currently is)
Training for staff

Role of other professionals
Working with different type of patients (e.g. those living with dementia)
Medical, fracture, medications

Phase 2: Categorising and identifying clusters of codes into conceptual themes comparing perspectives across professional groups using the "one sheet of paper method" approach to synthesise into four themes**

Applying model to practice
Barriers to implementation
    Barriers external to the health system
Opinion on model
Strengths of model
Weaknesses of model
Feasibility of model for applying to all patients
Goals of model
Improvements
    Improvements external to the health system
Model outline
Model rationale

Work processes
Advocacy (for patients, resources)
Customisation of care to the patient
Monitoring success/ outcomes (e.g. audits)
Managing comorbidities (cognitive impairment; other health conditions)

Team and work environment
Communication
With team, other services in community
Ways of communicating, tools, meetings
Congruence of opinion
Emotional impact to staff
Leadership
Other staff's role
Own role
Pandemic
Relations with other staff
  Linkages (outside one's immediate team; referrals; community care; charities)
  Team culture (work climate)
  Team motivation
  Teamwork (ways of working together with other staff)
Systemic problems (coming from the way the health system currently is)
Responsibilities
Resources in setting
    Resources to help more vulnerable patients
Provision over the weekend
    Resources outside the health system (charities, social care etc.)
Training for staff
Role of other professionals

Working with different type of patients (e.g. those living with dementia)
	Medical, fracture, medications

Working with patients and family/carers
Communication
With patients and carers
Patients
	Patient engagement
	Environment of hospital and resources
	Patients for whom model does not work
	Education, expectations from rehabilitation
Family and carers
	Education, expectations from rehabilitation

Phase 3: Mapping themes to TDF domains

Conceptualising a model of rehabilitative practice

Across services, recurring factors perceived to facilitate optimal rehabilitation (by at least 3 participants) included: teams working well together and supportive consultants and senior management who encouraged improvements to current rehabilitation services (*Social Influences, Social/professional role and identity*), organisational systems for patient notes and to prompt assessments, access to specialised professionals or services (e.g. orthogeriatricians, dieticians, specialised wards), having responsibility over patients' rehabilitation journey (e.g. deciding on referral pathway or discharge criteria), or providing activities to engage patients in rehabilitation *(Memory, attention and processes, Environmental context and resources, Belief about capabilities, Belief about consequences).*

Where individual participants thought that the model fell far below expectations, this was related to services undergoing significant organisational changes, or shortage and fluctuation of resources such as financial provisions and staffing (*Environmental context and resources*)

> *"I think if we're well staffed we can meet you know, and certainly and do pretty well with the audit and see people quickly, but I think as soon as we're pressured certainly over the winter months it can be really difficult and if we don't have the staff often it doesn't become as high a priority as people that are actually needing to go home that day." (P17, Band 6 OT)*

Competing professional and organisational goals

Participants commonly commented on a mismatch between the flexibility required to adjust to individual needs (*Skills*) and the organisational goals for a standardised, pre-set model for rehabilitation after hip fracture (*Social/professional role and identity*). This was often reflected by healthcare professional goals of a good foundation for functional recovery on discharge, and organisational goals for discharge home as soon as possible (*Goals*). These competing goals sparked frustrations with participants emphasising the challenges of making a one-size-fits-all model work for the diverse scope of patients that they see with hip fracture (*Intentions*):

> *"[I]n the acute service it's so driven towards just getting someone out of hospital that you can sometimes lose sight of what, what that individual needs as such." (P16, Band 7 physiotherapist)*

> *"[A]ny models are set up for the majority, not for the individual patient, despite everyone aiming to be patient-centred." (P10, consultant ortho-geriatrician)*

Engaging teams in collaborative practice

For most (n =17), the collaborative nature of their work was underscored in the discussion of their own role and others' perceived role in rehabilitation (*Professional role and identity*). Participants often commented on perceived unique and overlapping areas of their professional practice and how the engagement of each health professional may vary depending on the needs of an individual patient (*Skills*), for instance one consultant said:

> "*For somebody who is normally very well or functional, drives a car, gets out and about and they've literally tripped over something and broken a hip, then their rehabilitation is largely going to be the physiotherapist because their needs, otherwise, aren't so great. For somebody who is much frailer with cognitive impairment and delirium and lives at home and has a lot of functional deficit, then actually the physiotherapist may not have as much a role to play. It may be more occupational therapy and me and the nursing staff.*" (P9, female, orthogeriatric consultant, 18 years of experience)

A positive team culture was also enabled by dedicating time to support shared learning within and across professional groups *(Skills*). This learning included both formal (in-service training) and informal (support to extend skills) training which was sometimes evaluated through e.g., audit to enable advocacy for additional resource *(Behavioural regulation),* but often not, as one OT voiced:

> "*We've given the empowerment, if you like, we don't have to get a patient up on day zero, nursing staff will do it. So we've gone in with them, we've taught them, we've given them the competencies, they're competent to do it, they take the same assessments as we do and they can get them up and get them going*." (P5, female, team lead orthopaedic physiotherapist, 21 years of experience)

Engaging patients and their carers

Promoting a positive attitude towards rehabilitation was considered of particular importance in the context of limited physiotherapist and/or occupational therapy staff resources (*Belief about consequences, Goals*). To reinforce this individual responsibility of the patient, health care professionals often felt they needed to present a unified front to support patients' independence, by reminding and facilitating this approach to rehabilitation among different team members (*Belief about capabilities, Social/professional role and identity).* For instance, one consultant commented:

> "*I explain to patients, part of your rehab isn't just the time that you spend with the physio or with the OT, it's also the time walking out to the bathroom with the nurse or the healthcare assistant or even by yourself is a part of your rehab because that's you starting to use your muscles again and starting to practice your walking etc, that lots of activity that you're doing in hospital without maybe another person being there with you."* (P19, female, orthogeriatric consultant, 3.5 years of experience)

All healthcare professionals acknowledged that taking ownership for their early rehabilitation after hip fracture would not be possible for all patients. In particular, the challenge of supporting patients with cognitive impairment to engage in rehabilitation was identified across all professional groups (*Belief about consequences*).

** See reference 30 in main paper