



Patient perspectives of process variables in musculoskeletal care pathways

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ABSTRACT

Background: The prevalence of disability caused by musculoskeletal conditions continues to increase. Little research has considered the effect of process variables of a musculoskeletal care pathway on patient outcomes. A process variable is as any modifiable factor in a pathway that can be quantified and measured and that if varied may achieve a different operational or patient outcome. The perspective of patients on what process variables are important in musculoskeletal care pathways remains unknown.

Objective: The aim of this study was to investigate which process variables are important to patients and what their experiences of these processes were during the rehabilitation of their musculoskeletal conditions. **Method:** A qualitative study using a reflexive thematic analytical approach was undertaken. Four focus groups with 12 participants were conducted. Thematic analysis was utilized on the focus group data.

Results: Four key themes were generated: 1) Process matters; 2) Quantifying progress facilitated patient engagement; 3) Benefits of equitable access of care; and 4) Recovery made easier with navigation.

Conclusion: Patients with musculoskeletal conditions recognise the importance of process variables, especially timeliness, order of care, coordination of care delivery, quantifying progress, equity of access and navigation. These findings offer insights to care pathway designers as well as future research opportunities examining the effects of process variables on the outcomes of patients with musculoskeletal conditions.

1. Introduction

The prevalence of disability caused by musculoskeletal (MSK) conditions continues to increase, presenting a mounting burden on health-care systems around the world (Briggs et al., 2018; Vos et al., 2020). In New Zealand, 25% of adults are affected by a MSK disorder and over 15% of all New Zealanders visit their General Practitioners (GP) each year with MSK conditions (Bossley and Miles, 2009). The New Zealand health system expenditure due to MSK diseases is sizeable, contributing 16% of the total expenditure for non-communicable disease and nearly 10% of the total health expenditure spend (Blakely et al., 2019).

In response to this growing problem, researchers have shifted their focus to high value care for MSK conditions (Lentz et al., 2020; Traeger et al., 2019). This value-based approach includes care that is patient-centered, guideline concordant, measures patient outcomes and is cost effective (Cook et al., 2021). Value-based MSK care also considers process variables of a health system, for example the amount and timing of treatment, order and co-ordination of care, as well as ensuring unnecessary treatment provision doesn't occur (Jesus and Hoenig, 2015;

Lentz et al., 2020). A process variable has been defined as any modifiable factor in a pathway that can be quantified and measured and that if varied may achieve a different operational or patient outcome (Harvey et al., 2024).

In New Zealand, the Accident Compensation Corporation (ACC) insurance scheme funds most accident-related MSK conditions and recently it commissioned pilot rehabilitation programmes called Escalated Care Pathways (ECP). Under the ECP, treatment suppliers (such as Careway) were asked to design and implement innovative high value care pathways to manage specific MSK conditions including the knee, shoulder and low back (Accident Compensation Corporation, 2022; Reid et al., 2021). A feature of these pathways is that validated outcome measures are taken at specific time points and there is a defined exit criterion. Hence, these ECP provide an opportunity to consider and examine how processes variables influence patient outcomes.

There has been little research into patient perspectives regarding process variables in MSK care pathways. Hills & Kitchen (2007) employed focus groups to explore satisfaction with outpatient physiotherapy treatment in patients with acute and chronic MSK conditions.

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The authors identified four themes, one of which was ‘treatment process’. Specifically, patients expressed that ease of accessibility and not having long waiting lists for care enhanced their treatment satisfaction. A qualitative systematic review and meta-analysis of research that had investigated factors that influence patient-therapist interactions in MSK physiotherapy was performed by O’Keeffe et al., in 2016. They reported that organisational and environmental aspects of physical therapy were key themes, with patients being generally dissatisfied about a lack of organization regarding timing of appointments, delays in gaining appointments and lack of appropriate resources and facilities (O’Keeffe et al., 2016).

The existing evidence indicates that the organisational aspects of care within MSK health systems may contribute to the therapist-patient interaction and patient satisfaction with physiotherapy treatment. What is not known is the patient’s perspective on processes variables in MSK health care pathways and how they affect outcomes. The aim of this study was to investigate which process variables are important to patients and what their experiences of these processes were during the rehabilitation of their MSK conditions within the Careway ECP.

2. Methods

2.1. Design

A qualitative research design using reflexive thematic analysis was used (Terry and Hayfield, 2021). The consolidated criteria for reporting qualitative research (COREQ) guidelines was used to guide reporting of the research (Tong et al., 2007). Ethical approval (number 23/229) was obtained for this study by the Auckland University of Technology Ethics Committee.

2.2. Participants

Participants were former patients (from the greater Auckland region, New Zealand) with MSK injuries covered by ACC and included in the Careway ECP rehabilitation programme. Participants needed to have completed or been discharged from treatment within the six months prior to inclusion in the study. The sampling strategy was to purposively sample the participants so that they were representative of different genders, ethnicities, ages and musculoskeletal conditions, to ensure diversity. Potential participants were recruited independently of the research team by a Careway database administrator. Included in this initial email was a consent form, a study information sheet and an invitation to contact the primary researcher to participate. Participants contacted the primary researcher to discuss any questions they had about the study and to confirm they satisfied the inclusion criteria. Participants were then invited to one of four focus groups held at the Auckland University of Technology northern campus in late 2023. Participants were not known to the primary researcher or research team prior to the focus groups. Fifteen participants contacted the primary researcher, and all met the inclusion criteria. All 15 completed a consent form but only 12 participants attended the focus groups (see Table 1). Three participants were unable to attend the focus groups due to clashes with their work or study schedule. Females (50%) and Māori (17%) were represented in the sample and most participants had completed either a knee or shoulder (83%) rehabilitation pathway. The age range of the participants was 19–77 years, and the median age was 50 years old.

2.3. Data collection

Four face-to-face focus groups took place. The focus groups were recorded using Otter audio recording technology (Otter.AI, Mountain View, CA, USA) on an iPhone. The primary researcher conducted all the focus groups and took field notes. The focus groups with two participants took 45–60 min each and the focus groups with four participants took 75–90 min each. Prior to the focus group the participants received a

Table 1
Participant demographic information.

Participant reference	Focus group	Ethnicity	Gender	Age	Injury pathway
P1	1	NZ European	Male	70	Shoulder (Post-operative)
P2	1	NZ European	Female	43	Knee (Post-operative)
P3	1	NZ European	Female	38	Ankle (Non-operative)
P4	1	NZ European	Female	60	Shoulder (Post-operative)
P5	2	NZ European	Male	51	Knee (Non-operative)
P6	2	Sth American	Female	30	Knee (Post-operative)
P7	3	Māori	Male	50	Shoulder (Post-operative)
P8	3	Asian/Māori	Female	42	Ankle (Non-operative)
P9	4	NZ European	Male	77	Shoulder (Post-operative)
P10	4	NZ European	Male	55	Shoulder (Post-operative)
P11	4	NZ European	Female	19	Shoulder (Post-operative)
P12	4	NZ European	Male	55	Knee (Post-operative)

detailed information sheet about the study’s aim and with an explanation and example of a process variable within a care pathway. Open questions were piloted in a practice focus group and following feedback from those participants and the research team, a list of guiding questions was used in the focus groups. During the focus groups the open questions were reframed to clarify which processes went well or not.

- Tell us about your rehabilitation experiences during Careway?
- What processes worked well?
- Did you reach you goals?
- What did not go so well?
- Can you expand on why things did not go so well?
- What things were barriers to a good outcome and what things facilitated a good outcome?

Repeated reflection of answers to the participants was used by the primary researcher during the focus groups as a method of informal participant checking. The focus group session ended once all the questions had been discussed thoroughly. Participants were asked if they wanted to review transcripts, but none indicated that they wished to do this. The research team did not need to return to participants for clarification of the transcribed focus group interviews.

2.4. Data analysis

Analysis using Braun and Clarke’s six-phase approach was used to construct meaning-based patterns and themes (Braun and Clarke, 2006, 2013; Terry and Hayfield, 2021). The primary researcher’s engagement with the data was guided by an interpretive and post-positivist lens with a realist ontological approach. This allowed the primary researcher to be reflexive to the reality of patients and the processes that matter to them in the management of MSK conditions.

Data analysis was supported by NVivo software (V.12.1.0; NVivo 12, QSR international Pty, Australia). Focus group recordings were transcribed verbatim by Otter audio recording technology, before being de-identified and checked for accuracy by the primary researcher. Familiarization of data occurred immediately through listening to the audio recordings, and re-reading transcripts and field notes. Familiarization notes were made for each focus group. Coding was completed by the primary researcher who employed an inductive approach utilising

mainly semantic (explicit meaning) as well as latent (implicit deeper meaning) coding. Informed by the research question, the primary researcher created a code book with 40 codes from the focus groups. The codes were examined by the research team for similar ideas and meanings and clustered together to generate four prototype themes. The primary researcher tested these initial themes using a thematic table to visualise the codes that built each theme and how the themes related to each other (Appendix 1).

The next phase was the development and refinement of the themes which was an iterative process for the research team. There were many revisions and refinements with the themes being tested against the coded data to ensure the story being told was a fair reflective interpretation (Terry and Hayfield, 2021). The next step was the theme definition and naming phase. In this stage the primary researcher wrote theme definitions to bring together each theme’s central organising concepts and to confirm the theme and subthemes had the necessary theoretical and explanatory richness to begin writing (Terry and Hayfield, 2021). The research team discussed and met again at this stage to agree on the theme definitions and to decide the final names of the four themes.

3. Results

Four themes were generated: (1) Process matters; (2) Quantifying progress facilitated patient engagement; (3) Benefits of equitable access of care; and (4) Recovery made easier with navigation.

3.1. Process matters

Participants described how their rehabilitation experiences were influenced by the process variables and the interaction between different health professionals within the care pathway. Participants strongly acknowledged the timeliness of the care they received once in the care pathway, however, there were some delays with initial entry into the care pathway. The theme encompasses the participant’s belief that access to physiotherapy and the wider rehabilitation team took place in an efficient and well-organised manner. Participants appreciated seeing the correct health professional in the care pathway at the right stage of their recovery journey and valued the collaboration between members of the interdisciplinary team and the interprofessional communication. However, several participants stated that having to have the surgeon approve when physiotherapy or certain activities could start after surgery was not ideal. The participants thought the care received was individualized and of high quality. Table 2 provides examples of statements that represent the various subthemes that contributed to this theme.

3.2. Quantifying progress facilitated patient engagement

Participants appreciated the regular outcome and physical impairment measurements that were performed throughout their rehabilitation. Most participants reported that these measures enabled them to see progress, which both encouraged them and kept them accountable. Quantifying progress helped participants with frustrations and improved commitment towards rehabilitation. Some participants commented how the questionnaires weren’t helpful to them. Table 3 provides examples of statements that reflect the various subthemes that contributed to this theme.

3.3. Benefits of equitable access of care

Participants reflected on the accessibility to physiotherapy rehabilitation and how this influenced their recovery. They unanimously agreed that the removal of financial costs to having physiotherapy allowed them to attend and receive the necessary care required for their rehabilitation. There were frustrations from participants with accessing insurer funded taxi transportation. Participants acknowledged that

Table 2

Examples of statements that represent the various subthemes that contributed to the process matters theme.

Subthemes	Participant quotes
Timeliness	“Actually, really quick! Yeah. I think being on Careway helps” (P8) “Physio started straight away, there wasn’t any delays” (P1) “I was delayed with getting put into the Careway programme” (P2)
Co-ordination of care	“Because you’re not having to chase after people and run around. And because it’s sort of basically done for you really, the surgeon contacted me and said you had this referral. Can you please call for an appointment? Okay. It was all done sort of in the background, really. And I found that great, helpful” (P4) “I wasn’t allowed to work. It was the surgeon. I wasn’t allowed to drive for six weeks he said” (P2) “No don’t move for six weeks the surgeon said. And then the physio told me she wouldn’t see me for another six weeks” (P4)
Right clinician, right time	“The physio explained it to me that the next step would be the occupational therapist because of the job that I do” (P4) “I got to the right people at the right time” (P12)
Collaboration and interprofessional communication	“It was more collaborative” (P3) “You are in physio hands the whole lot. And it just progressed to the surgeon, and everybody was involved, and it just went on from there and they just took care of it for me. But I did get it all explained to me right from the start and the physio, the physio, she did tell me the whole system and how it worked and what it was about” (P4)
Individualisation and high-quality care	So, we would meet initially once a week, and then every fortnight and she (physiotherapist) would show me the exercises herself, which was great. And she would see me watch me do it. And correct me or say, you’re doing okay, so that was great” (P6) “It’s a good principle rather than the minimal threshold you are aiming for an optimal threshold or an optimal recovery it’s nice, it makes it more pleasant you know” (P12)

Table 3

Examples of statements that represent the various subthemes that contributed to the quantifying progress facilitated patient engagement theme.

Subtheme	Participant quote
Motivating and engaging	“But the Careway (pathway), it was more. I could see the progress. So, I’m going to keep going until I’m fixed. And the level of fix at the end was a much higher-level fix” (P10) “The questionnaire wasn’t helpful to me. I didn’t mind doing because I knew the physiotherapist needed those results” (P6)
Accountability and progress towards goals	“Well, what ended up happening is my physio would show me the results of the physical test part of it, and that was a motivator. It was good to see the whole progression” (P11) “So, it was cutting-edge rehab that I received, it was optimal, measured. And you know when I was slipping off or I wasn’t doing well” (P12) “The quality-of-life survey each month is fine but very generic. And it didn’t really have any insight into whether things were getting much better or much worse because you’re ending up with roughly the same score each month” (P5)
Reduced frustrations	“And I was getting frustrated because I felt like I wasn’t making any progress. But I realized that it is a slow, slow progress for the recovery. And I think seeing my physio and he’s like, Yep, you’re doing good and on track” (P2)

physiotherapists were able to deliver an appropriate amount of treatment based on the participant’s individual needs and were not constrained by a pre-set approved number of treatments. In contrast

participants reported how physiotherapy sometimes continued when they thought it was no longer required. Participants also reported that no-cost access to gym facilities for their rehabilitation was valuable and enabled them to commit to the prescribed exercise program. Equally, free access to equipment to use at home to complete daily rehabilitation was appreciated. Table 4 provides examples of statements that represent the various subthemes that contributed to this theme.

3.4. Recovery made easier with navigation

Participants reflected on the value of having the treating physiotherapist as their main guide and source of information for their rehabilitation pathway and recovery care plan. They appreciated the availability of the physiotherapist to answer specific questions about their recovery and advice to negotiate barriers to their rehabilitation. Some participants reported some frustration with the return to sport testing. Participants valued the physiotherapists provision of support and advocacy for their physical and mental needs as well as information about additional entitlements and logistical support. Not all physiotherapists had the required information regarding participant entitlements. Reinforcing theme two, participants valued the physiotherapist's role in reassessing, reevaluating and changing rehabilitation goals as required. Table 5 provides examples of statements that reflect the various subthemes that contributed to this theme.

Table 4
Examples of statements that represent the various subthemes that contributed to the benefits of equitable access of care theme.

Subthemes	Participant quotes
Access to physiotherapy	<p>"Removing that barrier allowed me to have all the treatment I needed and if I didn't it would have taken longer to recover" (P3)</p> <p>"It was important that it was close. They were there within walking distance" (P10)</p> <p>"And I think I tried a couple of times to arrange a taxi but just, it just didn't work. And it just was too hard. Yeah, too hard basket" (P2)</p>
Removal of financial barriers	<p>"Absolutely the costs. Otherwise, I would not have gone and see my physio weekly, I'm not sure about the specialist appointment, I would have. I don't even know how that would have worked in terms of funding how much I might have had to pay. But I certainly would have been a little more reluctant to pursue physio that diligently. And that quickly, hugely aided my recovery" (P3)</p> <p>"Because it was for free. I saw my physio weekly. Otherwise, I don't think I would have if I'd had to pay for it or at least pay part of it. Yeah, I don't think I would have gone as often" (P1)</p>
Correct amount of treatment	<p>"So that they (physiotherapist) can give you the treatment that they think you need. Careway makes it easier for them to do that. Because they're not fighting with ACC, to get the treatment, they're saying we're going to be able to get you better. And we're not going to be mucking around about trying to do it within 12 visits or in 24 visits. It's a case of we're here to help you get better. And you'll be getting what you need to get better" (P5)</p> <p>"The goal was to stop physio as soon as possible. I didn't want to go if I didn't need to. It was physio fatigue, physio overload" (P10)</p>
Gym facilities and equipment was valuable	<p>"I think the cost to but in parallel with that the opportunity or the ability to use the facilities like the gym, with no access to a gym, my rehab would have been way slower" (P2)</p> <p>"Rehab resistance bands, gym membership, and swimming pool access, which was really good for pain relief and movement" (P5).</p> <p>"I got a bike for my rehab which was good" (P11)</p>

Table 5
Examples of statements that represent the various subthemes that contributed to the recovery made easier with navigation theme.

Subthemes	Participant quotes
Physiotherapist the main guide	<p>"You can see how to navigate the pathway because having the physio recommend somebody or the next step and telling me this is what's going to happen" (P4)</p> <p>"It was explained as the goal to get to. I mean, it was pretty much explained to me to be able to pass was to limit the risk of reinjury to not only the leg that operated on, but also to help in the way that I wouldn't injure the non-operated leg. They took the time to explain" (P2)</p> <p>"I had kind of been prepared from my specialist who said, no one ever passes at first. And I'm like, why? What's the point of the physio putting someone up to a test if no one ever passes it the first time?" (P6)</p>
Navigating barriers	<p>"He was a senior physio for the organization. And he obviously had a record of how things were tracking. So, his (physiotherapist) comments suggested that there would be a steady range of improvements as we went long. But occasionally, I used to run into pain barriers, and he said don't go there. Leave the exercises for a fortnight. Those exercises which caused the pain. He helped me understand" (P9)</p>
Support and advocacy	<p>"Like that would be my word for it, is thorough, which just meant like mental health wise confidence that you can get back to it wiser, like, just makes the whole thing, the whole recovery process easy. But it's a traumatic process, you know, surgery and however it affects you to not be able to play sport, not be able to work like so it's really nice to know that you have something that's going to get you back into life" (P11)</p>
Goals changed	<p>"Along the way, I found out that I wasn't going to (fully recover), it doesn't feel the same, it's not going to be the same. So, I gave up on my (return to sport) goals. And ultimately, I had reached a point where me and the physiotherapist agree that that's the maximum" (P6)</p>
Entitlements	<p>"It was great, the physio gave me the info. After surgery. I needed a taxi to and from appointments. I got someone to come in to clean my house somehow. Yeah, that was great" (P6)</p> <p>"The physio didn't know so I looked it up. Used Google to find out the sort of the process and then rang ACC and you had to do it this way" (P2)</p>

4. Discussion

The theme, 'process matters' to participants and their recovery, was the dominant finding from this study. A range of process variables were identified by the participants as being important and significant to their outcomes and overall recovery. Our findings support that of previous qualitative research that has investigated both patient and therapist perspectives on factors that influence patient-therapist interactions in MSK physiotherapy (O'Keefe et al., 2016). O'Keefe and co-authors reported that physiotherapist interpersonal and practical skills, individualized patient-centered care and organizational factors, such as the length of time of appointments and the flexibility to change appointments easily, were important. Patients and therapists both identified these processes variables as important for patient-therapist interactions in MSK physiotherapy.

In contrast, in a recent review of MSK patients and their perceptions of their experiences of health services, none of the themes identified were related to process variables (Chi-Lun-Chiao et al., 2020). Themes related to the functional and relational aspects of patient's care highlighted the significance of the physical and environmental needs, trusted clinician expertise, information needs and understanding patient expectations (Chi-Lun-Chiao et al., 2020). Our study adds new understanding to these previous studies by solely exploring patient perspectives of which process variables matter to them in MSK care pathways and how this influences their rehabilitation experiences and outcomes.

Timeliness of care appears to be an important process variable

identified by the participants. Our findings support those of previous qualitative research in this field that has reported that short waiting times and access to prompt orthopaedic and physiotherapy care is important to MSK patients and is linked to patient satisfaction (Potter et al., 2003). Timeliness has been investigated in MSK care pathways by Brennan et al. (2015) who performed a retrospective analysis of electronic health data to evaluate the timing of outpatient care following total knee arthroplasty. These authors reported that fewer days between discharge as an inpatient to the initiation of outpatient clinic based physiotherapy, was associated with lower pain and higher functional levels at the completion of the outpatient rehabilitation (Brennan et al., 2015).

As well as not having any unnecessary delay to their assessment and treatment, our participants recognised that coordinated care allowed them to see the right clinician at the right time and to flow smoothly through the pathway. In healthcare, the term flow represents the journey of patients between clinicians, departments, and organisations along a pathway of care (Health Foundation, 2013; Showell et al., 2012). A seamless journey through a MSK care pathway requires a defined patient population to be matched with an appropriate clinical expert in a synchronized and efficient manner (James and Savitz, 2011; Jesus and Hoenic, 2015; Kreindler, 2017). Our findings demonstrate that the Careway participants recognised and valued its streamlined processes that facilitated communication between the different health professionals (via a digital patient management system) and the delivery of collaborative and coordinated care. These processes enabled the interdisciplinary teams to facilitate patients in an end-to-end care pathway from entry, through to orthopaedic, physiotherapy and vocational rehabilitation.

In this research, participants were unanimous in their belief that their access to care was enhanced by the removal of financial and logistical barriers to treatment and that this was beneficial to the outcome of their treatment. Our participants were clear that having access to conveniently located physiotherapy care and rehabilitation facilities without paying a co-payment charge or gym fees allowed them to engage with the rehabilitation program and to attain their goals. This supports the findings of previous research which has demonstrated that cost is a barrier to access primary health care treatment in New Zealand (Jatrana and Crampton, 2021; Perry et al., 2015). In the study by Perry and colleagues, participants who were receiving outpatient physiotherapy (without a co-payment) in a socioeconomically deprived area of New Zealand were interviewed and reported the convenience of a nearby location influenced their attendance (Perry et al., 2015). Although our cohort of participants did not come from a socioeconomically deprived area, they did have their physiotherapy co-payment removed and also reported that accessing a physiotherapist local to them was important. In a recent review of factors affecting patient engagement in exercise rehabilitation, variables such as having easily accessible and no cost rehabilitation and resources were essential to rehabilitation patients (Teo et al., 2022).

There has been a focus recently towards the use of high value care for MSK patients (Cook et al., 2021). High value care is defined as care that delivers the most value for the patient, and the clinical benefits outweigh the costs to the individual or system providing the care (Gleahill et al., 2023). Under the Careway programme the patient had no financial burden, and they received treatment sessions based on clinical need and their progress towards their goals. Interestingly, in a recent one year follow up study it was found that neither the number of visits or the financial cost of nonsurgical shoulder related care was associated with patient improvements or outcomes (Clewley et al., 2020). Removing financial barriers and costs for patients was seen as beneficial in our study, and health system designers should consider having processes in place to ensure the cost of treatments funded within a MSK care pathway is of high value.

Participants in this study reported that regular use of patient reported outcome measures (PROMs), and physical measurements of their

strength, helped motivate them to engage in their rehabilitation plan and assisted their recovery. Previous research has highlighted this relationship between process and outcomes, labelled as the process-outcomes interface (Jesus and Hoenic, 2015). As patients receive treatment and clinicians quantify and measure their progress towards their functional goals, both patients and clinicians receive valuable information. Physiotherapists taking regular muscle strength measurements and reviewing PROMs receive up to date information on the patient's clinical progress. Based on this monitoring process variable, clinicians can adjust their interpersonal communication and treatment to meet the patient needs, leading to a more rapid improvement in patient functional outcomes (Jesus and Hoenic, 2015; Lin et al., 2020; O'Keeffe et al., 2016).

From a patient's perspective, seeing real-time updates on their functional progress can facilitate behavioural and psychosocial outcomes such as engagement and motivation (Cook et al., 2021; Jesus and Hoenic, 2015). It was found in a recent review of patient engagement to rehabilitation that increasing self-efficacy, improving perceived capability to exercise, using goal setting and enhancing the perceived benefits of the exercise, all improved patient adherence (Teo et al., 2022). Our results showed that giving patients visibility over their PROMs and strength measures and having the physiotherapist explain the test results, increased the patient's confidence, motivation and engagement. In a prospective observational cohort study, the associations between physiotherapy treatment processes for musculoskeletal conditions and outcome measures were investigated (Deutscher et al., 2009). These authors found that compliance with the rehabilitation exercise programme was one of the strongest predictors overall for patient outcomes and the strongest predictor among process variables (Deutscher et al., 2009). These results are comparable with the patients view from our study, that better outcomes were achieved when the patients were more engaged and dedicated with their exercise programme.

Our participants valued the role of the physiotherapist as the main source of support, information and navigation during their rehabilitation and recovery. They described that their recovery was made easier with physiotherapists being readily available to answer questions on their recovery, rehabilitation goals, as well as provide clinical support, advocacy and advice on entitlements and resources. The benefits of health care navigators was first reported in the field of oncology where navigators were introduced to improved access to timely screening and better coordination of cancer care delivery (Freeman, 2006; Paskett et al., 2011). Research in socioeconomically deprived areas of the USA has demonstrated that patient navigation is an effective intervention in promoting screening, timely diagnosis and treatment of different cancers (Freeman, 2006; Paskett et al., 2011). A recent review examined the effectiveness of system navigation programmes linking primary care with community-based health and social services to improve patient, caregiver, and health system outcomes (Teggart et al., 2023). These authors concluded that both lay person-led or health professional-led system navigation models seem to improve patient experiences with quality of care compared to usual care (Teggart et al., 2023). Our findings demonstrate that that a dedicated navigator is considered important to patients with a MSK injury, supporting these previous research findings.

Whilst navigation seems important to MSK patients, what is unclear is its cost-effectiveness or if it improves patient-related outcomes (Teggart et al., 2023). This has been explored in a recent study where the effects of the use of a non-clinical lay navigator on the cost and resource use of older adults with cancer was investigated (Rocque et al., 2017). Rocque and colleagues reported significant reductions in hospital patient costs, emergency department visits, hospitalizations, and intensive care. The clinical advantages and cost benefit of a layperson acting as a navigator in a MSK care pathway versus a physiotherapist fulfilling the navigator role in addition to their normal clinical duties should be examined.

The findings from our study extends our understanding of the

theoretical frameworks of process variables within care pathways. Donabedian states that within health care systems and care pathways an inter-dependent relationship between structure, process, and outcomes exists (Donabedian, 1988, 1988b). A process variable has been recently defined as any modifiable factor in a care pathway that can be quantified and measured and that if varied may achieve a different operational or patient outcome (Harvey et al., 2024). In our qualitative study we looked to explore what process variables in MSK care pathways are important for recovery. Participants in our focus groups identified the process variables of timeliness, co-ordination of care, collaboration, individualisation of treatment, equity of access, quantifying progress, as well as navigation of the pathway are important for their recovery from their MSK condition. They also identified frustrations with the failure of some of the process variables. Our results are in line with a theoretically proposed and unvalidated quality framework for post-acute (PAC) rehabilitation (Jesus and Hoenig, 2015). The authors theorised several process variables in their framework considered important for post-acute rehabilitation patient outcomes: individualisation, amount and timing of treatment, and coordination of care. The authors also identified the need for the care framework to have structure including personnel, facilities and equipment and organisation management (Jesus and Hoenig, 2015). Our study highlights the importance of MSK care pathways to provide the structure that enable effective process variables to facilitate and moderate patient outcomes (Batalden and Davidoff, 2007; Gartner et al., 2022; Hancock and Kent, 2022).

4.1. Implications

This study is the first to investigate which process-related variables are considered important for patients enrolled in a MSK care pathway. Our findings clearly demonstrate that there are a variety of process variables that matter to MSK patients. Timeliness, order of care, processes that facilitate interdisciplinary collaboration, and the collection of outcome measures should be considered and prioritised. Additionally, patients value high quality physiotherapy treatment, the removal of financial barriers and visibility on their progress towards their functional goals. Clinicians should consider how regular measurement of patient progress and navigational support through the MSK care pathway influences patient engagement. These findings should help inform the design of future care pathways and highlights the importance of process variables on patient experiences and outcomes.

4.2. Limitations

There were several limitations from our study that must be considered. Firstly, the participants may have given responses that they thought the primary researcher wanted to hear and the findings may not reflect the experiences of all patients enrolled in the Careway ECP

programme. We don't know if our participants were just a select group with positive experiences of the Careway programme or if it was a group that had problems with the programme and wanted this opportunity to express their opinions. We tried to mitigate this risk of selection bias by having a balance of open-ended questions focussing on process variables that both did and did not go well for the patients. Members of the research team were familiar with the Careway ECP programme and played a role in the development of the process of the care pathways which may have affected data analysis through observer bias. This was mitigated by the primary research maintaining reflexivity through an interpretive and post-positivist lens with a realist ontological approach and by critical reflection by the researcher team. A final possible limitation is that this study only explored the perspectives of patients in New Zealand, and most patients had either knee or shoulder conditions, which may limit the generalizability of the results to other settings.

5. Conclusion

Patients with MSK conditions recognise the importance of process variables, especially timeliness, order of care, coordination of care delivery, quantifying progress, equity of access and navigation. Patients also identified that process plays a significant role in how they flow through a MSK care pathway. These findings offer insights to care pathway designers as well as future research opportunities examining the effects of process variables on the outcomes of patients with MSK conditions. Additionally, the cost effectiveness of patient navigators within care pathways should be explored.

CRediT authorship contribution statement

Daniel Harvey: Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization. **Steve White:** Writing – review & editing, Validation, Supervision, Methodology, Conceptualization. **Duncan Reid:** Writing – review & editing, Validation, Methodology, Conceptualization. **Chad Cook:** Writing – review & editing.

Disclosure of interest

Daniel Harvey and Duncan Reid are clinical advisors for Careway. Daniel Harvey is a treatment provider for Careway. Steve White and Chad Cook have no disclosures.

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Appendix 1

Thematic table to show the codes that were clustered to develop the four prototype themes.

Pathway structure enables process of care	High value care facilitated engagement and motivation	Cost and location were important	Recovery made easier with navigation
Clear pathway or flow through the programme	Access to exercise equipment or gym membership access	Cost was a barrier	VIP-feeling important by the MDT
Compare and contrast versus business-as-usual physio care	Attendance and engagement enhanced	Location close by is important	Surgeon laying down law-strict guidelines
Exit criteria or finishing the pathway not clear	Confidence in the physio is important	Logistics of accessing the gym was frustrating	Patient goals and expectations
External physio for return to sport (RTS)- validate patient and physio effort	Patient reports experience measures (PREMS)- used regularly	Physio rehabbing client in the gym	Physio was the main contact or navigator for the patient

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Pathway structure enables process of care	High value care facilitated engagement and motivation	Cost and location were important	Recovery made easier with navigation
ECP allowed physios to deliver good care Communication between the health professionals was beneficial and valued Surgeon laying down law-strict guidelines	Goal focussed rehabilitation Motivating trying to beat the limb symmetry index (LSI) testing Physio rehabbing client in the gym	Ordering a taxi or transport was challenging No charge-free physio was a facilitator	LSI explained and its importance More explanation needed for strength and RTS tests Motivating trying to beat the LSI testing
Initial delay being entered into Careway	Length of time receiving care and treatment	Quick timely access to specialist under Careway Length of time	Trust with a physio from previous experience was important
Specialist writing medical certificates to clear for work gatekeeper Logistics of accessing the gym was frustrating	Physio fatigue- ongoing sessions when patient was recovered Prehabilitation as recommended by surgeon/physio	Accessing (General Practitioners) GPs difficult Access to exercise equipment or gym membership access	Vocational rehabilitation added to the rehabilitation journey Seeing physio regularly increased engagement
Physio and surgeon entered patient	Patient report outcome measures (PROMS)- used regularly	Appointment times were important	Physio fatigue- ongoing sessions when patient was recovered
Ordering a taxi or transport was challenging	Rehab plan helped achieve the goal and outcomes	Compare and contrast versus business-as-usual physio care	Ordering a taxi or transport was challenging
Quick timely access to specialist under Careway Specialist or Surgeon entering patient	Seeing physio regularly increased engagement Value in physio rehab	Physio fatigue- ongoing sessions when patient was recovered Structure of the pathway and expected timeframes and stages of rehab was beneficial	Hurt vs harm - setting expectations Difference between patient perceived progress vs physio's perceived progress
Structure of the pathway and expected timeframes and stages of rehab was beneficial	Appointment times were important	Vocational rehabilitation added to the rehabilitation journey	Communication between the health professionals was beneficial and valued

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