



# 'Their role has a lot of purpose beyond being just being about exercises': a qualitative study of patients' experiences of physiotherapy following a mild traumatic brain injury

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## ABSTRACT

Following a mild traumatic brain injury (mTBI; also known as concussion), physiotherapists may be involved in injury identification, assessment and rehabilitation. However, how people perceive and experience the physiotherapist's role is not well understood. Semistructured interviews were undertaken with patients who saw a physiotherapist individually or as part of a multidisciplinary team following mTBI in New Zealand. Interviews were recorded, transcribed verbatim and analysed using the interpretive descriptive approach. A total of 12 interviews were held with participants aged 19–67 (50% female; mean age 37 (SD=14.8) years) who had a mTBI on average 9 (SD=8) months ago. Thematic coding of interviews generated four themes, each supported by three to five categories representing their experiences: (1) 'How physiotherapy could help me'—representing how the interventions were delivered; (2) 'Empower me to manage my mTBI'—representing participants' learnings to self-manage; (3) 'Set me up to get the most out of treatment'—representing considerations needed before, during and after practice to maximise engagement and (4) 'Get to know me and what's important to me'—representing the importance of considering the person as a whole, and preferences for assessment, intervention, communication and culture throughout service delivery. Overall, participants reported variable mTBI care experiences yet perceived the physiotherapist as having a key role in supporting self-management and treating headaches, neck pain and balance issues. mTBI physiotherapy care needs to be more attuned to patients' preferences and circumstances and delivered in a way that maximises rehabilitation outcomes. Building effective therapeutic connections with patients may be key to addressing these concerns simultaneously in practice.

## INTRODUCTION

Mild traumatic brain injuries (mTBIs) occur following a force to the head or body that results in an altered level of consciousness and includes injuries referred to as concussions.<sup>1</sup> Despite being classified as mild injuries, up to

### WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Physiotherapists have been identified as playing an important role in facilitating recovery from mild traumatic brain injury (mTBI). However, it is unclear how patients perceive their role and experience physiotherapy interventions.

### WHAT THIS STUDY ADDS

⇒ People valued the care they received from physiotherapists following a mTBI, particularly that which helped to address vestibular-ocular dysfunction.  
⇒ This study adds new knowledge about how physiotherapists can deliver care that more closely reflects the unique needs of people living with mTBI.

### HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ This study provides practical tips, from the patient's perspective, that physiotherapists can employ in their practice to promote positive care experiences and recovery for people following a mTBI.

half of patients diagnosed with mTBI will not recover within weeks, months or even years.<sup>2–6</sup> For these individuals, mTBI can seriously impact all aspects of their lives, including study, employment, social relationships and engagement in the community.<sup>4,5</sup> mTBI is a global concern, with general population incidence ranging between 200 and 800 people per 100 000.<sup>7,8</sup> With a projected growing and ageing global population, early identification, assessment and appropriate management of mTBI are critical moving forward as the incidence of mTBI is likely to increase.

mTBI is a complex condition that is characterised by symptoms that can be grouped into physical (eg, headache, dizziness, balance dysregulation and nausea), behavioural/emotional (eg, fatigue, anxiety, depression) and cognitive domains (eg, difficulty

remembering and concentrating, feeling in a fog).<sup>1</sup> These symptoms may be exacerbated or overlap with other conditions such as cervical strain, neurological disorders, medicines, depression and developmental disorders (eg, ADHD),<sup>9</sup> highlighting the importance of performing a thorough assessment for differential diagnoses.<sup>10</sup> Consequently, early, multifaceted assessment and interdisciplinary management for mTBI is recommended to optimise recovery.<sup>11</sup>

One health profession often involved in supporting people with mTBI, particularly in relation to sports, is physiotherapy. Indeed, in the community, up to 21% of TBIs across all ages may be attributable to sport and recreational activities,<sup>12</sup> highlighting the opportunity for physiotherapy to address sports-related concussion. Physiotherapists can also support initial screening, assessment (eg, cervical, vestibulo-ocular and autonomic/exertional impairments), management (eg, reassurance, education to self-manage, graduated return to learn/sport/work) as necessary both within the sports context, but also more generally,<sup>13–15</sup> and deliver care across settings (eg, multidisciplinary concussion clinics, sports grounds and in people's homes).<sup>15</sup> Physiotherapists have sound knowledge, particularly in sports-related concussion<sup>15–17</sup> and desire to be more involved in mTBI care.<sup>15</sup> At the same time, general practitioners (GPs) report low confidence in managing aspects of mTBI, such as graduated return-to-play or work<sup>18 19</sup> and patients can experience delayed access to GPs. Early access to recovery advice is recommended in mTBI guidelines<sup>1 13</sup> and has been found to significantly improve patient outcomes.<sup>20 21</sup> Physiotherapy may be able to support GPs to deliver timely and appropriate mTBI care, but a key component missing from this conversation is what people with mTBI think about physiotherapists' involvement in their care and experience of physiotherapy following mTBI.

Improving the individual experience of healthcare is a key component of modern value-based care.<sup>22</sup> However, to improve the individual experience, it is important to understand the current experience and identify where improvements can be made.<sup>21 23 24</sup> The current study aims to gain an in-depth understanding of patients' perceptions and experiences of physiotherapy care following mTBI.

## METHODS

### Design

This study is underpinned by constructivism and uses an interpretive descriptive (ID) methodology.<sup>25 26</sup> A strength of the ID approach is its focus on generating practical solutions for investigating clinical phenomena. Consequently, a data-driven, inductive approach to analysis was adopted to foster insights into people's experiences of physiotherapy following mTBI. A reflexivity statement describing how the background of the research team shaped the current study in the context of the ID approach is reported in online supplemental file 2).

This study was approved by the Auckland University of Technology Ethics Committee (21/423) and is reported aligned with the consolidated criteria for reporting qualitative studies<sup>27</sup> (online supplemental file 1). A statement of the current study trustworthiness is also reported in online supplemental file 2.

### Participants and recruitment

People with a history of mTBI aged  $\geq 16$  years were invited to participate in one-to-one interviews between 1 February and 30 June 2022, focusing on their preferences for and experiences of physiotherapy on their recovery. To enrol in the study, participants needed to meet the following criteria: (1) diagnosis of mTBI in the past 5 years; (2) aged  $\geq 16$  years; (3) able to read and converse in the English language. We excluded individuals who had moderate or severe TBI as their healthcare needs and healthcare pathways are different to those with mTBI. Participants were able to take part in whether they had recovered from their injury or were still recovering, or whether they saw a physiotherapist or not to capture the perspectives of those who may have wanted physiotherapy care but were not able to access it.

A convenience sample of people with a history of mTBI from around NZ was created using advertisements in social media (eg, Facebook, Twitter), physiotherapy practitioners and through the AUT Traumatic Brain Injury Network. Potential participants were invited to contact the researcher (JC) by phone or email about the study, where they could ask questions and be screened against the inclusion/exclusion criteria. Informed consent was recorded from each participant before engaging in the interviews. An NZD\$40 honorarium was offered to participants for their time and contributions.

### Data collection

Interviews were guided by a semistructured interview schedule (box 1) developed by the research team (JC, AT, DR) to explore participants' perceptions and expectations of physiotherapy following mTBI. Interviews were conducted between February and March 2022 by an experienced qualitative researcher (JC), either face-to-face in a quiet space or online with participants (to enable flexibility in patient preference and flexibility with changing restrictions due to the COVID-19 pandemic). The interview was audio recorded, and the interviewer took field notes to inform the analysis.

### Data analysis

Audiorecorded interviews were transcribed verbatim using Otter.ai software. Each transcript was checked for accuracy, corrected and imported into Nvivo (release 1.7.1) for analysis. The transcripts were read line-by-line and then inductively assigned codes independently by one researcher (JC) using a thematic approach.<sup>28</sup> Next, codes were grouped by similarity into, conceptually discrete categories through an iterative process which involved comparing codes, reviewing transcripts and

## Box 1 Semistructured interview schedule

### Key question

⇒ Probing question

1. What was your experience of healthcare services after your injury?
  - What worked well?
  - What did not work well?
  - How was your experience aligned (or not aligned) with your cultural preferences?
  - What cultural sensitivities are important to you?
  - Which aspects of the recovery were most important to you?
2. What role do you think physiotherapists should play in the management of traumatic brain injury, if any?
  - Did you see a physio as part of your treatment? If so, what did you find helpful or not? Or if not, would you have liked to see a physio?
  - Would you be happy to see a physio in the future if you had another brain injury?
  - Are there particular things that you think they could help with?
3. Reflecting on your personal experiences, in a perfect world, what would the best physiotherapy care look like to you for mild traumatic brain injury?
  - What are the most important things that should underpin this care?
  - Who would be involved?
4. What factors would make it easier for you to access this care?
  - What support would you need?
  - Who might need to be involved?

concepts. During this process to align the output analytical process with the interpretive description approach, the researcher asked themselves, ‘what is happening here?’, ‘what am I learning about this?’ and ‘is this knowledge relevant to progress people’s experiences of physiotherapy-led mTBI care?’ Four transcripts were reviewed and coded independently by a second analyst (AT) to ensure rigour. Higher-order themes were then derived using the categories by the two researchers to develop a thematic framework representing participants’ experiences of physiotherapy following mTBI. The wording of the framework’s categories and themes was then refined through discussion between the authors (JC, AT, DR, SJ). Following developing the draft thematic framework, participants were invited to comment on whether it faithfully represented their perceptions and expectations of physiotherapy for mTBI. The framework was then refined, based on their feedback and guided by vision Mātauranga, ‘ka mura, ka muri’ (walking backwards into the future), whereby participants could verify the content of the study findings. Following this process, the language and formatting were described as inclusive, disability friendly and accessible. Overall, feedback was that the framework reflected their experiences with refinements made to clarify language and emphasis.

### Patient involvement

Patients were not involved in the research design but were invited after the interviews to comment on a summary of the research findings and practice points. OD is a

person with lived experience of mTBI and provided critical feedback on interpreting data and recommendations generated from this study.

## RESULTS

Participants’ demographic characteristics are provided in [table 1](#). Twelve interviews were held with participants (n=6, 50% female), lasting between 34 and 120 min. Participants were between 19 and 67 years, with a mean ( $\pm$ SD) age of  $37\pm 14.8$  years. The mean time since the last mTBI was  $9.4\pm 8.3$  months. One-third of participants sustained their injury in a sports context, while the others sustained it through motor vehicle or workplace accidents. Ten participants accessed physiotherapy through NZ’s publicly funded concussion service, and two participants saw a physiotherapist in private practice who was not part of a concussion service.

Analysis of the transcripts initially produced 72 overlapping codes, which were then refined and consolidated into four themes, each supported by two to five categories describing participants’ experiences of physiotherapy care: (1) How physiotherapy could help me; (2) Empower me to manage my mTBI; (3) Set me up to get the most out of treatment and (4) Get to know me and what’s important to me. Five participants (41.6%) reviewed a summary of the thematic framework and practice points presented in [figure 1](#).

Participants described educating themselves about mTBI, leading their healthcare journey, and navigating a fragmented healthcare system. Managing mTBI involved balancing fatigue with activities of daily living, family, work, social obligations, healthcare and income. Various physiotherapy care was delivered to participants, from recognition of mTBI through initial assessment to management. Despite some experiencing negative interactions with physiotherapists, all participants stated that they would see another physiotherapist again. Physiotherapy was felt to be an important part of the rehabilitation process however, across the themes, participants advocated for physiotherapists to listen more, acknowledge the sum of their concerns and support them to learn, heal and/or live with mTBI. The results are presented below, along with practice points, summarised in [figure 1](#).

### Theme 1: How physiotherapy could help me

#### The interventions delivered

Participants felt that physiotherapy was key to their recovery and would seek physiotherapy if they were to experience another mTBI. Interventions delivered included recognition and screening for suspected mTBI (sport-setting); screening for balance, cervicogenic and other injuries concurrent to the mTBI; assessment of symptoms and exercise tolerance; on-referring to other services or investigations (eg, X-ray, concussion services); prescribing graded exercise (eg, vestibular ocular and cardiovascular exercise), return to work and working with other providers in a multidisciplinary team setting.

**Table 1** Demographic characteristics of the interview participants (N=12)

Characteristic		n (%)
Number of diagnosed mTBI	One	8 (67)
	Two	4 (33)
Cause of injury	Accidentally hit by an object/person/animal	7 (58)
	Assault	2 (17)
	Fall	3 (25)
Context of injury	Activity of daily life	2 (17)
	Travelling	2 (17)
	Sport	4 (33)
	Work	2 (17)
	Other	2 (17)
Gender	Man	5 (42)
	Woman	6 (50)
	Other	1 (8)
Ethnicity	European	7 (58)
	Māori	2 (17)
	Other ethnicity	3 (25)
Highest level of education	Secondary education	4 (33)
	Postsecondary education (eg, technical)	3 (25)
	Bachelor's or higher	4 (33)
	Master's or equivalent	1 (8)
Occupation	Manager	1 (8)
	Professional	4 (33)
	Technician, labourer or driver	3 (24)
	Other	4 (33)
Intimate relationship	Yes	8 (67)
	No	4 (33)

Rehabilitation to resolve balance and headaches was advocated as the most useful intervention. Addressing these issues allowed participants to focus on other aspects of recovery and regain their quality of life.

I think it was good for me to see the physio. I do think that she helped out a lot. It probably would have taken me a lot longer to recover if I hadn't been going to a physio in general, and I think she did a good job of helping me out. **ID12**

#### Perceptions of my physiotherapist's knowledge and confidence about mTBI

Participants who had mixed experiences of physiotherapy felt that physiotherapists' mTBI knowledge and skills were too generic, which impacted their overall recovery trajectory.

...I think that's one of the reasons why my recovery was delayed; it was just not having the right... physiotherapist with the right experience and skills to be able to educate, to be able to set the plan to

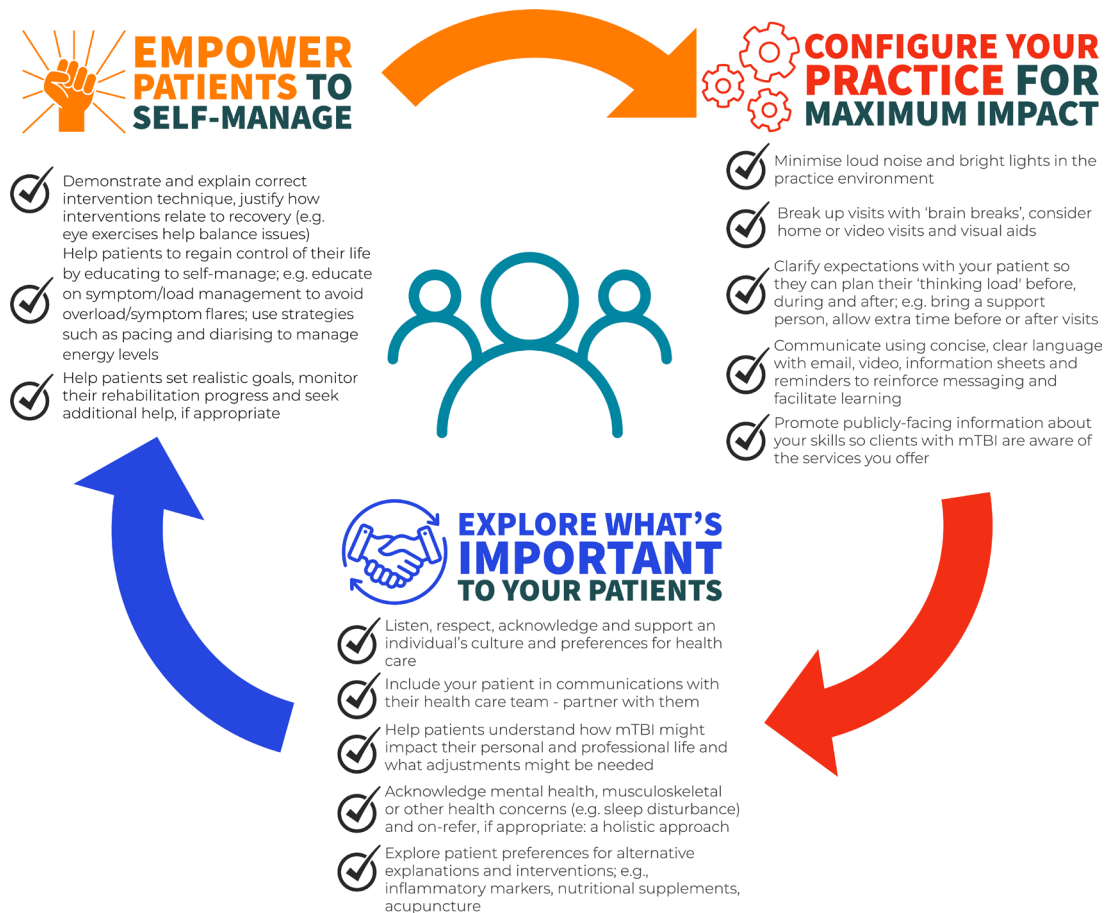
actually understand what a brain injury or concussion client actually needs and how to navigate [living with mTBI]... **ID14**

One participant explained how their physiotherapist abandoned an exercise because they were unable to match the rehabilitation to their abilities.

...I think physios here do try and have some skills. But I just think that you know, like with me and my balance issues, it just, I needed more specific basic input before I was good enough to do, you know, those balance exercises. **ID9**

Some participants were also unaware that physiotherapists could be knowledgeable in mTBI care. In this respect, they desired better public-facing and online information from physiotherapists with relevant experience to facilitate their health navigation.

I'd go to the physio before I see a doctor or anyone for most injuries, but I just didn't even think about it



**Figure 1** Practice points for effective mTBI care, incorporating the themes 'Empower me to manage my mTBI', 'Set me up to get the most out of treatment' and 'Get to know me and what's important to me' to build-up theme 1: 'How physiotherapy could help me'. mTBI, mild traumatic brain injury.

[for mTBI]...I would have thought about it if I had a sore neck...But I'd never thought about it. **ID3**

### Theme 2: Empower me to manage my mTBI

Help me to understand why exercises are important, how they work and how to do them

Participants strongly advocated for a better understanding of how exercise related to their recovery plan: what it is and how it worked. Poor explanations about what exercise targeted led to some participants unintentionally delaying their recovery due to overstimulating their mTBI symptoms (eg, through excessive cardiovascular exercise) or abandoning the rehabilitation strategy altogether.

...believe it or not, exercise, like being on the bike and doing my graded exercise. I worked out that actually recharged me like, how does that work? **ID9**

Support me to self-manage, monitor and seek additional help, if appropriate

Participants felt that learning how to adjust to a new pace of life was understated by physiotherapists and, in some instances, contributed to their delayed recovery. Self-managing energy and fatigue was key to improving

quality of life. Explaining the concept of pacing, why it is important and how to do it was particularly important for those who previously led highly active lives or were motivated to push through their mTBI symptoms early in their health journey. Goal setting was important to track recovery and avoid feelings of uncertainty about rehabilitation progress.

I think, like, I never really like got explained like what like, you know, the end goal and like the journey... So I think maybe like a bigger picture sort of explanation, like, this is what we're trying to achieve. Here are some like concrete goals, you know, to have, and then the pathway to get there. **ID7**

### Theme 3: Set me up to get the most out of treatment

Review the practice environment

The practice environment impacted the extent to which participants could fully participate in their rehabilitation. Noisy and bright clinics meant that some participants were fatigued before they started their rehabilitation. One participant also desired more privacy during his physiotherapy visits. Clinics that had low noise levels, space to recharge, and opportunities to provide anonymous feedback were liked by participants.

I can tell you the environment that you walk in, it's bright lights, they've got a noisy radio on reception. And they, despite you complaining about it, they never turn it down. It's horrendous. **ID6**

#### Clarify expectations before I arrive

Participants wanted to know what to expect during their visit so they could plan how to manage their energy levels before, during or after the consultation. For example, wearing appropriate clothing for exercise. Bringing a support person or whānau (family) to help record and process information was also advocated to help support information processing following mTBI.

And just also remind them too if they want to bring a person, because I was like physio - yep, to me it's just like getting your arm fixed or whatever. I didn't understand the importance of what was going to go on, as well. **ID6**

#### Consider my context and what might work best for me

Participants wanted to be able to choose modes of care delivery that aligned with their preferences. Offering home visits or virtual (eg, Zoom) consultations was considered an efficient way for some participants to maximise their energy and time throughout the day. One participant, for example, noted that their decision to attend physiotherapy appointments was a trade-off between the appointment time, work, personal commitments and the mTBI symptoms that were exacerbated with travel.

So the concussion clinic has two sites, one in like [location A], you know, just up from the kind of [Road A]. And the other one out in [location B]. Now I live in [suburb]. And that's like, equidistant to both, right. And I couldn't drive at the time...And getting into an Uber and they're, like blasting music, and you're just, like, and they want to chat, and it's just, like, you kind of have to be like, 'can you please just leave me...' I didn't like that part of it. **ID3**

#### Deliver education that resonates with my capacity to learn

Delivering education that aligned with an individual's ability to consume information was considered a key aspect of effective healthcare. Enabling strategies included using multiple formats to help offset symptoms interfering with learning, such as fatigue and forgetfulness (eg, information sheets, emails, video and inviting support) or changing the practice environment to minimise fatigue. The use of pen and paper exercise sketches was not preferred.

Communicate to me in a way that accounts for my energy levels and symptoms that might make it hard for me to remember or concentrate during a visit. Use Email, video, information sheet, follow-up. **ID6**

#### Theme 4: Get to know me and what's important to me

##### Treat me like a person

Most participants reported having positive experiences and professional relationships with their physiotherapist. A strong theme that emerged was being treated with kindness, respect and acknowledgement of their journey into the unknown and learning to live with mTBI. Negative physiotherapy care experiences emerged where participants recalled dishonesty, patronising behaviour, and helplessness concerning their recovery trajectory. Participants wanted to feel assured that they would be okay and that they were in a safe environment.

I was actually treated fairly and with respect. The other physio did not treat me with respect. So she, I don't know, she just, it was, yeah. **ID6**

##### Help me to understand the potential impact of mTBI on my life

Participants strongly advocated for physiotherapy to help them understand what to expect from mTBI. Participants wanted to know how long it might take to recover and what changes in mood and energy levels to expect that might impact family, work and daily activities (eg, decision-making, travel and grocery shopping). An important education component about mTBI included skills to communicate their health needs and life adjustments to others (eg, with family and employers) who were typically learning how to support a person with mTBI for the first time.

So, you know, if somebody could bloody explain what the fuck was happening to me, the fact that I wasn't better after three months, and that is something that happens to some people, and what that means and what you need to do, would have been really bloody helpful. **ID3**

##### Consider me as a whole: provide holistic care

Participants want their physiotherapists to consider a person's biological, psychological and physical status. However, some participants did not feel their concerns were being acknowledged or addressed. Some felt that their needs regarding the invisible side of mTBI—for example, depression or psychological trauma—were not addressed. One participant suggested that physiotherapists refer to another provider with skills in mental health, for example, a support person. Participants also wanted to see physiotherapists consider how inflammation, sleep and nutritional status could influence recovery and explore if other interventions could contribute to their recovery, such as dietary supplements, yoga and meditation.

Yeah, so one of the biggest problems I had with [my physiotherapists] was that they were incredibly focused on the neurological symptoms. It was all about balance it was all about my eyesight...And I was saying, this is one of my biggest issues. And they kind of would just FOB me off. **ID19**

### Consider my culture

Participants generally felt they were delivered care that met their cultural needs. However, some participants desired the Māori worldview to be more integrated into the care they received. They preferred to see a better understanding of how the head is considered *tupu* (sacred) in the Māori worldview and wanted to experience more *Te Reo* (Māori language), Māori providers, Māori health services and Māori interventions. Participants wanted to see the Māori health model reflected in practice (*Te Whare Tapa Whā*): spirituality, mental health, family connectedness and its integration with self-care and self-love were proposed as areas pursuant to culturally responsive Māori healthcare.

...why can we not have more accessibility to being able to use our own cultural practices and treatments and why can't that actually be in the concussion plan?

**ID14**

### Involve me in your communications with my MDT

Participants wanted to be equal partners in their healthcare team and wanted physiotherapists to advocate for them. For example, one participant wanted to be more involved in discussions about returning to work, and others did not feel like their healthcare team was coordinated despite receiving care from various disciplines. Positive experiences were related to developing a partnership with their physiotherapist and building trust through hearing the same healthcare messages across different providers and evidence of a coordinated healthcare approach.

So I believe that the coordinator was calling and emailing the physio but I wasn't involved in that email chain. So they were discussing about me behind my back. Which I found a little bit unsettling. It's like, if you're talking about me, shouldn't you actually be sending me a copy of what you're discussing? **ID19**

## DISCUSSION

This study explored people's perceptions and experiences of physiotherapy care following mTBI. The results highlighted that while participants valued the physiotherapy they received, they wanted care to be more closely aligned to their unique circumstances, concerns and identity. The findings suggest that the impact of physiotherapy for mTBI could be enhanced by considering the practice environment clarifying patients' preferences for care and education to self-manage.

The first key learning from participants in this study was that patients valued physiotherapists' involvement in their care, from assessment to management for mTBI (theme 1: How physiotherapy could help me). However, some participants reported undesirable experiences and felt that physiotherapist knowledge was too generic. For example, one participant explained how an exercise to resolve balance issues was abandoned because

their physiotherapist could not appropriately tailor the exercise to them. Another recalled how they felt their physiotherapist had used all the tools available to them, and more specialist knowledge would have been helpful. This is of concern because most participants in the current study received care from physiotherapists within specialised concussion clinics. Consequently, physiotherapists may benefit from practical education modules to improve core competencies for mTBI management. The findings also suggest a need for future research to focus on identifying mTBI care priorities to inform the aspects of mTBI care that need to be embedded into undergraduate curricula to strengthen workforce capacity using a similar approach that has been proven to be effective in pain management.<sup>29</sup>

The Ontario Neurological Foundation guidelines for mTBI recommend concurrent treatment of symptoms, such as neck pain, dizziness and headache following mTBI.<sup>1</sup> Addressing these symptoms may help patients better access treatment and address other problems, such as psychological distress.<sup>13 30 31</sup> In the current study, participants felt that physiotherapy was particularly useful for persistent symptoms of headache and balance impairments and for guiding exercise tolerance. Addressing these impairments was highly valued because they represented significant roadblocks to accessing other aspects of their rehabilitation and quality of life. In general, the incidence of vestibulo-ocular impairments is estimated to be between 30% and 80% regardless of TBI mechanism and severity.<sup>32</sup> Growing evidence suggests that targeting vestibulo-ocular symptom clusters may support the recovery of individuals who are at risk of longer-term recovery.<sup>31 33</sup> For some patients with predominantly vestibulo-ocular symptoms, it may be appropriate to manage these individuals within primary care by their GP and physiotherapist.<sup>18</sup> Given that some GPs may not feel confident managing a patient with mTBI,<sup>18</sup> we suggest that suitably skilled physiotherapists could fill this gap for people recovering from mTBI, which could support the right care at the right time.<sup>34</sup> These findings reinforce the importance of selecting interventions that are most likely gainful for an individual's circumstances,<sup>9</sup> and the need for health systems that deliver timely and appropriate care.

Another key finding from this study was that participants wanted more control over their recovery following mTBI (theme 2: Empower me how to manage my mTBI). Patient empowerment for self-management is a key component of patient-centred care, which is relevant given the growing body of evidence showing that mTBI symptoms may last months to years after injury.<sup>5 24</sup> In the current study, participants advocated for skills to help self-manage their mTBI so they could find the balance between their symptoms and their daily responsibilities. Participants wanted strategies to monitor and manage fatigue, such as using a diary (time and energy management), mindfulness exercises (eg, 'brain breaks') and control over overstimulating situations (eg, minimising

busy grocery shopping time, wearing tinted glasses). They desired better communication about what an intervention intended to address (eg, fatigue), how it worked (eg, stimulation of the autonomic nervous system), why it was prioritised over other approaches or symptoms (eg, addressing vestibular-ocular dysfunction ‘opens up’ access to other treatments) and how to manage or address the issue (eg, submaximal cardiovascular exercise). This finding overlaps with patients experiences of interdisciplinary care for mTBI in Australia, suggesting that this need may need to be systematically addressed across providers involved in mTBI care. Growing evidence suggests that clinician education to improve patient self-management benefits patient outcomes<sup>35 36</sup>; physiotherapists may consider upskilling in this area to supplement their confidence in delivering self-management education that resonates with patients following a mTBI.

Our findings also suggest that physiotherapists need to be more aware of mTBI symptoms that can interfere with a patient’s ability to participate in their rehabilitation (theme 3: Set me up to get the most out of treatment). Not attending to uncertainty about not knowing what’s going on, what to do and how long recovery will take can cause distress among patients with mTBI and, therefore, could be a helpful component of physiotherapy care.<sup>21</sup> Our findings augment this evidence as we found that in addition to advice to help them understand what had happened to them and their likely prognosis, participants wanted physiotherapists to help them understand what to expect during their clinical visit so they could plan, for example, managing their energy levels before or after their appointment. We interpret that physiotherapists should consider using multiple strategies to facilitate information processing, which can be affected after mTBI. For example, modifying the practice environment (consider low noise, low light and video consultations), using video, email and written resources to support verbal communication, breaking up sessions with ‘brain breaks’ and including a support or whānau (family) person in consultations.<sup>23</sup>

Participants expressed a desire for physiotherapists to better understand their concerns and preferences for healthcare and treat them as equal partners in their healthcare journey (theme 4: Get to know me and what’s important to me). One interpersonal approach towards building patient-centred practice that is useful in neurorehabilitation is therapeutic connections. This approach is associated with decreased levels of emotional distress and increased rates of rehabilitation compliance, which is particularly important for patients with mTBI who often wrestle with the uncertainty of their recovery and feelings of anxiety, confusion and invalidation.<sup>21</sup> Engaging meaningfully in practice is critical to the healing journey and health outcomes and is increasingly becoming a central component of culturally responsive healthcare in NZ.<sup>37 38</sup>

## Strengths and Limitations

A key strength of this study is the specific focus on perceptions of physiotherapy care as part of multidisciplinary rehabilitation services and in isolation. However, we acknowledge that all but two participants experienced physiotherapy care from physiotherapists likely to be knowledgeable and confident managing mTBI within multidisciplinary concussion services. A purposeful sampling approach could have allowed for greater breadth of experiences. Therefore, the findings of this study may not represent clinical encounters with physiotherapists who are not already upskilled in mTBI care. Our findings may not be transferable to countries where different cultural norms may result in different expectations about practice and treatment. Pain perception, disability and healthcare utilisation, for example, are influenced by cultural practices and values.<sup>39 40</sup> Given the diverse makeup of Aotearoa/NZ, we recommend verifying these findings in future research involving a more diverse sample of participants.

## CONCLUSION

This study’s findings highlight key practice aspects for physiotherapists to consider when supporting someone following mTBI. Patients want to be engaged and receive care attuned to their preferences and circumstances to maximise the value gained from rehabilitation. Building effective therapeutic connections with patients may help address these concerns simultaneously in practice.

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#### REFERENCES

- Marshall S, Bayley M, McCullagh S, *et al*. Guideline for concussion/mild traumatic brain injury and prolonged symptoms: (for adults 18+ years of age). Ontario Neurotrauma Foundation; 2018.
- Fadyl JK, Theadom A, Channon A, *et al*. Recovery and adaptation after traumatic brain injury in New Zealand: Longitudinal qualitative findings over the first two years. *Neuropsychol Rehabil* 2019;29:1095–112.
- Kara S, Crosswell H, Forch K, *et al*. Less Than Half of Patients Recover Within 2 Weeks of Injury After a Sports-Related Mild Traumatic Brain Injury: A 2-Year Prospective Study. *Clin J Sport Med* 2020;30:96–101.
- Theadom A, Parag V, Dowell T, *et al*. Persistent problems 1 year after mild traumatic brain injury: a longitudinal population study in New Zealand. *Br J Gen Pract* 2016;66:e16–23.
- Theadom A, Starkey N, Barker-Collo S, *et al*. Population-based cohort study of the impacts of mild traumatic brain injury in adults four years post-injury. *PLoS One* 2018;13:e0191655.
- Cancelliere C, Verville L, Stubbs JL, *et al*. Post-concussion symptoms and disability in adults with mild traumatic brain injury: a systematic review and meta-analysis. *J Neurotrauma* 2022;40:1045–59.
- Lefevre-Dognin C, Cogné M, Perdrieau V, *et al*. Definition and epidemiology of mild traumatic brain injury. *Neurochir* 2021;67:218–21.
- Feigin VL, Theadom A, Barker-Collo S, *et al*. Incidence of traumatic brain injury in New Zealand: a population-based study. *Lancet Neurol* 2013;12:53–64.
- Silverberg ND, Iaccarino MA, Panenka WJ, *et al*. Management of Concussion and Mild Traumatic Brain Injury: A Synthesis of Practice Guidelines. *Arch Phys Med Rehabil* 2020;101:382–93.
- Mayer AR, Quinn DK, Master CL. The spectrum of mild traumatic brain injury: A review. *Neurology (E-Cronicon)* 2017;89:623–32.
- Jennings T, Islam MS. Examining the interdisciplinary approach for treatment of persistent post-concussion symptoms in adults: a systematic review. *Brain Impair* 2023;24:290–308.
- Theadom A, Starkey NJ, Dowell T, *et al*. Sports-related brain injury in the general population: an epidemiological study. *J Sci Med Sport* 2014;17:591–6.
- Quatman-Yates CC, Hunter-Giordano A, Shimamura KK, *et al*. Physical Therapy Evaluation and Treatment After Concussion/Mild Traumatic Brain Injury. *J Orthop Sports Phys Ther* 2020;50:CPG1–73.
- Cheever K, McDevitt J, Phillips J, *et al*. The Role of Cervical Symptoms in Post-concussion Management: A Systematic Review. *Sports Med* 2021;51:1875–91.
- Reid DA, Hume P, Whatman C, *et al*. Knowledge, attitudes, and behaviours of New Zealand physiotherapists to sports-related concussion. *NZJP* 2020;48:19–28.
- Yorke AM, Littleton S, Alsalaheen BA. Concussion Attitudes and Beliefs, Knowledge, and Clinical Practice: Survey of Physical Therapists. *Phys Ther* 2016;96:1018–28.
- Al Attar WSA, Husain MA. Physiotherapists are knowledgeable about sport-related concussion. *PPR* 2021;42:145–52.
- Stuart C, Reid D, Theadom A, *et al*. Knowledge and management of sport-related concussion in primary care in New Zealand. *N Z Med J (Online)* 2022;135:31–41.
- Thomas E, Chih H, Gabbe B, *et al*. A cross-sectional study reporting concussion exposure, assessment and management in Western Australian general practice. *BMC Fam Pract* 2021;22:46.
- Kontos AP, Jorgensen-Wagers K, Trbovich AM, *et al*. Association of Time Since Injury to the First Clinic Visit With Recovery Following Concussion. *JAMA Neurol* 2020;77:435–40.
- Snell DL, Martin R, Surgenor LJ, *et al*. Wrestling with uncertainty after mild traumatic brain injury: a mixed methods study. *Disabil Rehabil* 2020;42:1942–53.
- Berwick DM, Nolan TW, Whittington J. The triple aim: care, health, and cost. *Health Aff (Millwood)* 2008;27:759–69.
- Graff HJ, Christensen U, Poulsen I, *et al*. Patient perspectives on navigating the field of traumatic brain injury rehabilitation: a qualitative thematic analysis. *Disabil Rehabil* 2018;40:926–34.
- McPherson K, Fadyl J, Theadom A, *et al*. Living Life After Traumatic Brain Injury: Phase 1 of a Longitudinal Qualitative Study. *J Head Trauma Rehabil* 2018;33:E44–52.
- Thorne S, Kirkham SR, MacDonald-Emes J. Interpretive description: A noncategorical qualitative alternative for developing nursing knowledge. *Res Nurs Health* 1997;20:169–77.
- Thorne S, Kirkham SR, O'Flynn-Magee K. The Analytic Challenge in Interpretive Description. *Int J Qual Methods* 2004;3:1–11.
- 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* 2007;19:349–57.
- Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol* 2006;3:77–101.
- Slater H, Jordan JE, O'Sullivan PB, *et al*. 'Listen to me, learn from me': a priority setting partnership for shaping interdisciplinary pain training to strengthen chronic pain care. *Pain* 2022;163:e1145–63.
- Snell DL, Surgenor LJ, Hay-Smith EJC, *et al*. The contribution of psychological factors to recovery after mild traumatic brain injury: is cluster analysis a useful approach? *Brain Inj* 2015;29:291–9.
- McGeown JP, Kara S, Fulcher M, *et al*. Predicting Sport-related mTBI Symptom Resolution Trajectory Using Initial Clinical Assessment Findings: A Retrospective Cohort Study. *Sports Med* 2020;50:1191–202.
- Xiang L, Bansal S, Wu AY, *et al*. Pathway of care for visual and vestibular rehabilitation after mild traumatic brain injury: a critical review. *Brain Inj* 2022;36:911–20.
- Master CL, Master SR, Wiebe DJ, *et al*. Vision and Vestibular System Dysfunction Predicts Prolonged Concussion Recovery in Children. *Clin J Sport Med* 2018;28:139–45.
- Bastos Gottgroy R, Hume P, Theadom A. Healthcare pathways for mild traumatic brain injury patients in New Zealand, determined from Accident Compensation Corporation data. *N Z Med J* 2022;135:36–51.
- Collins C, Doran G, Patton P, *et al*. Does education of primary care professionals promote patient self-management and improve outcomes in chronic disease? An updated systematic review. *BJGP Open* 2021;5.
- Rochfort A, Beirne S, Doran G, *et al*. Does patient self-management education of primary care professionals improve patient outcomes: a systematic review. *BMC Fam Pract* 2018;19:163.
- Elder H. Indigenous Theory Building for Māori Children and Adolescents with Traumatic Brain Injury and their Extended Family. *Brain Impair* 2013;14:406–14.
- Wilson B-J, Bright FAS, Cummins C, *et al*. The wairua first brings you together': Māori experiences of meaningful connection in neurorehabilitation. *Brain Impair* 2022;23:9–23.
- Henschke N, Lorenz E, Pokora R, *et al*. Understanding cultural influences on back pain and back pain research. *Best Pract Res Clin Rheumatol* 2016;30:1037–49.
- Reis FJJ, Nijs J, Parker R, *et al*. Culture and musculoskeletal pain: strategies, challenges, and future directions to develop culturally sensitive physical therapy care. *Braz J Phys Ther* 2022;26:100442.