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- Implementation of a stroke self-management programme
- Physiotherapists and clients with suicidal thoughts and behaviours
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PHYSIOTHERAPY NEW ZEALAND
Kōmiri Aotearoa

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MOVEMENT FOR LIFE

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Physiotherapy in a sea of change

The New Zealand health system is about to embark on its biggest reform in 20 years. This comes on the back of a global pandemic, the like of which has not been seen since 1918. To state we are living in a state of flux is an understatement.

However, within a pandemic, there lies an opportunity. Physiotherapy as a profession within New Zealand has celebrated its centenary as a profession and more recently the centenary of legislation pertaining to the profession. It is a profession that has stayed the course. It has responded to the needs of the time, be it a polio epidemic, or world wars. With the advent of a social insurance scheme (the Accident Compensation Corporation), it has led the world in many respects with regard to direct access and in being an established component of the broader concept of primary care.

Yet, I wonder if there is still a lurking concern that it remains in many ways separate, and not fully integrated as part of the New Zealand health system. Herein lies the opportunity of the era of crisis in which we find ourselves. The role I inhabit in the Ministry of Health is the Chief Allied Health Professions Officer. This is the first time there has been such a role in the Ministry, to work alongside the Chief Medical Officer and Chief Nursing Officer as part of the Executive Leadership team. The establishment of the role stems directly from Dr Ashley Bloomfield as the Director-General of Health, who, as a previous Chief Executive of a District Health Board always had a full clinical team to advise and give direction. As such, he was quick to establish a similar role within the Ministry.

Having worked in the District Health Board environment for an extended period of time, transitioning to the Ministry has been one of the steepest learning curves in my professional career, in learning that the term 'machinery of government' is a real thing. As a Ministry, there is the dual role we play being kaitiaki or steward of the system and working with the sector itself, while also fulfilling the role of public servant.

I say this as a background to my earlier point as to whether there is still that lurking concern that physiotherapy is not seen as fully integrated into the New Zealand health system. While my role is to fulfil the kaitiaki role to the more than 40 professions that fall under the umbrella of allied health, there is the responsibility to identify opportunities where we can achieve better outcomes as we strive for the concept of Pae Ora (Healthy Futures), where we have a population that lives longer, lives better, with equity of outcomes for Māori and all other peoples.

Herein lies the opportunity. Embracing the concept of Pae Ora, we have the opportunity to ask some questions about where the profession is now, and where it could be. The benefit of the profession as a first point of call for musculoskeletal injuries has been well demonstrated. The impact of treating musculoskeletal injuries has a positive impact, not only on physical health, but also on mental health. So this should continue. But what are the opportunities that have not yet been fully embraced? How can physiotherapy as a profession begin to much more consciously align itself to the concept of Pae Ora? How can the profession encompass the fullness of the person and their environment as they move towards a broader realisation of wellness?

While purposefully posed as questions, they aim to represent some of the opportunities that lie before us in this period of change. For many, the impact of changes may be minimal as the revenue stream for services will be uninterrupted. However, there is the potential to begin to look at what else could be, and potentially, most importantly, to look at how physiotherapy better meeting the concept of Pae Ora can be funded. This would be a success of the upcoming reforms.

All of this loops back to a key learning for me personally in gaining a fuller understanding that the Ministry of Health should not be seen as separate to the delivery of health services. Rather, it should be seen as a component of the New Zealand healthcare system. The challenge I believe lies in front of all of us is to be informed of the changes that are occurring, and how physiotherapy as a profession can continue and, if anything, be more aligned to the needs of the population of Aotearoa New Zealand. These are both challenging and exciting times.

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Implementing and Evaluating the Bridges Stroke Self-Management Programme into a New Zealand District Health Board Stroke Service: A Case Study

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ABSTRACT

The impact of stroke is lifelong; affecting independence and quality of life. Stroke survivors need support to manage their recovery. The Bridges stroke self-management approach (Bridges) empowers stroke survivors and facilitates self-management within usual rehabilitation. We implemented Bridges into a New Zealand stroke service, aiming to identify context-specific delivery factors and long-term sustainability strategies. Using a case study design, data were collected from multiple sources, including meeting and training notes, researcher observations, workshop evaluations, and in-depth semi-structured interviews (n = 7). Data were compared for congruency or disparity, and integrated to develop a comprehensive case description. Overall, 69 health professionals were trained. Collectively, the data found Bridges to be conceptually acceptable and contextually appropriate, raising awareness of self-management support across the service. Identified key factors that would assist with the implementation of this new intervention, including the need for time and sustained support for staff; an initial small, contained inter-professional team; ongoing communication to staff by managers about their expectations and endorsement of the intervention; and staff "champions", requiring training, resources, and managerial support. Whilst staff may value Bridges, they needed time and the opportunity to develop knowledge, skills, and self-efficacy to support patient self-management.

Hale, L., McCulloch, M., De Ruiter, S., Wihongia, E., Mcdonnell Norlinga, E., Gorczynski, D., Linney, M., Kennedy, P., & Jones, F. (2021). Implementing and evaluating the Bridges stroke self-management programme into a New Zealand district health board stroke service: A case study. *New Zealand Journal of Physiotherapy, 49*(2), 58–69. https://doi.org/10.15619/NZJP/49.2.02

Key Words: Health Plan Implementation, Health Services, Self-Efficacy, Self-Management, Stroke, Stroke Rehabilitation

INTRODUCTION

In New Zealand about 50,000 people live with disability caused by stroke (Ranta, 2018) Although recovery from stroke can continue throughout life, little long-term rehabilitation is provided nationally for stroke survivors (Brown, 2009; Hogan & Siddharth, 2018). In New Zealand and elsewhere,

stroke survivors commonly express feelings of isolation and abandonment after discharge, and high levels of unmet clinical and social needs (Hogan & Siddharth, 2018; McKevitt et al., 2011; Pindus et al., 2018).

Stroke can be conceptualised as a long-term condition as there is a life-long impact on independence and quality of life (Jones, 2006; Fryer et al., 2016; O'Neill et al., 2008). Supporting self-management in stroke rehabilitation can improve quality of life and reduce dependency on others (Fryer et al., 2016). Self-management support has been defined as including "all the actions taken by people to recognise, treat and manage their own healthcare independently of or in partnership with the healthcare system" (The Evidence Centre for National Voices, 2014, p.3). As coping post-stroke can be extremely difficult and present complex challenges, such as low mood, or communication and mobility dysfunction, many people need to develop new skills and knowledge for self-management (Jones, 2006). Approaches using healthcare interactions within usual care to coach or support patient self-management skill development are proven to be beneficial and potentially cost-effective (De Silva, 2011; Jones & Brimicombe, 2014). Such approaches foster self-management skills from the outset, improve patient self-confidence, and avoid possible "learnt" dependency on health professionals. Early integration of self-management support for patients could reduce the sense of abandonment after discharge and enhance their ability to cope (Fryer et al., 2016; Newbronner et al., 2013).

In the Bridges stroke self-management approach (Bridges), health professionals are trained to support stroke survivors within usual rehabilitation interactions to develop the skills and confidence to take control of their own rehabilitation and recovery (Jones et al., 2009, 2015; McKenna, Jones, et al., 2015). A workbook, owned and completed by the stroke survivor, is a tool to facilitate this process. Patients are supported to reflect on their achievements, and attribute positive changes in their functioning and well-being to their own efforts, rather than to the skills and expertise of a healthcare practitioner (Jones et al., 2009, 2015; McKenna, Jones, et al., 2015). There is evidence that Bridges positively impacts functional activity, social integration, and quality of life (Jones et al., 2015), and has demonstrated feasibility of delivery and acceptability to patients, carers, and professionals in a variety of healthcare settings (Jones et al., 2015, 2016, 2017; Kulnik et al., 2016; McKenna, Martin, et al., 2015).

We believe Bridges has potential to support New Zealand stroke survivors in their recovery. Implementation of a new intervention, particularly at an organisational level, such as a stroke service, requires those impacted to embrace the intervention, and feel prepared, committed and confident in their collective ability to change practices (Moir, 2018). Implementation thus necessitates a systematic approach (Peters et al., 2013; Powell et al., 2019), acknowledging the importance of addressing key contextual determinants (Peters et al., 2013; Powell et al., 2019). This approach, developed in the United Kingdom, may not be acceptable or suitable in a New Zealand context. Our first study contextualised Bridges and its accompanying workbook for New Zealand, and established its relevancy and acceptability to both stroke survivors and stroke rehabilitation practitioners (Hale et al., 2014).

In this study, we aimed to further our understanding of the acceptability and potential for adoption of Bridges within the New Zealand context. We implemented Bridges into the stroke care pathway of a small New Zealand district health board (DHB) and evaluated implementation in terms of acceptability and adoption (Peters et al., 2013). The DHB's clinical board was supportive and had an expectation that self-management support would become an integral component of their healthcare service. Specifically, our objective was to identify (a) context-specific delivery factors, (b) sustainability strategies, and (c) staff perceptions of Bridges.

METHODS

Study design

We employed a mixed-method case study design to investigate a contemporary phenomenon within its real-world context (Yin, 2014). Case studies draw on multiple data sources to inform the research aims. Ethical approval was obtained from the Health and Disability Ethics Committee, New Zealand (reference 18/STH/93).

Setting

The study DHB serves a population of 60,000 (20% are older adults, about 900 are stroke survivors) and has about 100 stroke admissions per year (Ranta, 2018). Using a multidisciplinary approach, the stroke pathway begins with admission via the emergency department into the medical ward or the intensive care unit of the city hospital. Within two hours to four days, stroke survivors are transferred to the assessment, treatment and rehabilitation (AT&R) unit for a duration of at least 7 days. The integrative community assessment treatment team assists stroke survivors with a discharge plan, and the person is referred, as appropriate, to community organisations, such as the Stroke Foundation, a community stroke advisor, or the "Home First" service (a 6-week support and rehabilitation service in the person's home). Overall care is coordinated by the stroke clinical nurse specialist.

Implementing Bridges into the DHB stroke service

We used Normalisation Process Theory to guide a systematic and planned delivery of Bridges, as it provides a framework to assess facilitators and barriers to the integration of complex interventions into routine practice (Murray et al., 2010). This theory comprises four constructs that interact with the organisational culture and processes (Murray et al., 2010):

1. Coherence: We first illustrated to staff and management the differences between Bridges and current practice. We met with senior and middle managers, and staff over several months to gain an understanding of the DHB and its stroke services, and to raise awareness of Bridges, its aims and benefits.

2. Cognitive participation: Together with staff and management, we identified appropriate methods for incorporating Bridges into the DHB's ways of working, for example, which staff to involve, when and how to deliver training, and how to contextually adapt training relevancy (e.g., background context, culture, employment, rural and city dwelling), journey of stroke survivors through the services, and staff they will typically see.

3. Collective action: Through collaborative discussions and action planning, we contextualised training workshop material and identified strategies (e.g., drop-in lunchtime support sessions via videoconferencing) to support staff.
4. Reflexive monitoring: We reflected with staff to understand progress and thereby identified strategies to enable sustainability.

Training, which has been described by Jones & Bailey (2013), was delivered in two stages by two Bridges associate trainers, with a full-day initial workshop (June 2018) and half-day follow-up workshop 4 months later (November 2018). Due to shiftwork, many nurses could not attend the workshops, and an abbreviated 2-hr workshop was designed and delivered to ward nurses in line with previous Bridges training (Mäkelä et al., 2014). Prior to training, attendees experiences and perceptions about self-management support were explored; these findings have been reported previously (Taylor et al., 2019).

Between workshops, the Bridges trainers supported staff to implement Bridges with fortnightly newsletters and posters, email reminders, lunchtime videoconferencing sessions, and a face-to-face problem-solving workshop. In these sessions, trainers facilitated staff to problem solve challenges they were encountering (e.g., the speech and language therapist requested advice on how to adapt Bridges for her community-based communications group). Halfway through this period, one trainer (LH) spent time observing the practice of consenting staff on the wards and the community-based communications group, as a peer review exercise. Observations were noted on a Bridges study checklist, and staff provided feedback (McKenna, Martin, et al., 2015).

Data collection

Eligibility and recruitment

Multidisciplinary staff involved in the stroke service were requested by management to attend the training, and all were eligible for inclusion into the evaluative part of our project. Prior to training, we sent staff study information sheets and consent forms via email. Those staff wishing to be part of the evaluation stage provided us with a signed consent form. Staff chose the extent to which they wished to be involved in the evaluation and were reassured of anonymity. To further ensure confidentiality, one-on-one interviews (as opposed to focus groups) were undertaken to collect data.

Data sources

A range of data sources were used in the study:

1. Notes from meetings and observations made by research team members.
2. Training workshops evaluations completed during the two training workshops (Mäkelä et al., 2014).
3. A record of ideas from attendees of how they thought Bridges could be sustained in the service. This was requested from attendees in the second training workshop.
4. Qualitative semi-structured, in-depth interviews undertaken 2–3 months following the second training workshop with consenting staff, facilitated by one researcher (MMcC). Topics explored included feasibility and acceptability, benefits and limitations, delivery improvement, and sustainability. Interviews took place at a venue acceptable to the interviewees (to preserve anonymity), and were audio-recorded and transcribed in full by a commercial transcribing firm (instructed to ensure anonymity of participants and organisations).

Data analysis

Workshop evaluation data from closed questions were analysed descriptively (medians, ranges), and open-ended question responses were thematically analysed. Interview data were analysed guided by the General Inductive Approach (Thomas, 2016). In this process, the transcripts were individually and independently coded by six researchers (SDR, EW, EMcN, DG, ML, PK) without discussion, and then discussed by all, collated, and collapsed into four draft themes. These six researchers then recoded the transcripts with the draft themes, which, with further debate, were refined and an agreement on three finalised themes reached. Transcripts were recoded using the finalised themes, and a peer review of these codes and themes was completed by switching transcripts amongst the researchers and the primary author (LH). Other data collected (minutes, recorded observations, second workshop data) were read multiple times by the primary author, thematically coded, and collated. In keeping with the case study design, all analysed data were compared for congruency and disparity, and integrated to develop a comprehensive description of the case and address study objectives. Integrated data from all sources were discussed between the primary author and a researcher (MMcC) at three meetings to reach consensus, and verified with the DHB staff at a post-study presentation and feedback workshop.

RESULTS

In this section we present the data collected from each source.

Notes of meetings and observations

In our initial consultation with senior and middle management, the consensus was to adopt a targeted approach for implementing Bridges focussing on stroke and training all staff involved in the DHB's stroke care pathway, from acute to community. Thus, at the initial training workshop, 51 staff were trained (22 nurses, eight physiotherapists, eight occupational therapists, five social workers, two dietitions, one occupational therapy assistant, one speech-language therapist, one hospital liaison officer, two physiotherapy assistants, and one community stroke advisor). We did this over three full days, each member of staff attending one full day. At this point, the senior manager was able to fully engage and ensure staff attended, reimbursing those staff attending in their off-duty time. Unfortunately, restructuring of the DHB at a senior management level resulted in the senior manager taking on more duties, leaving less time to devote to the Bridges training. Additionally, following the first workshop, the staff turnover was high: five occupational therapists and one speech language therapist left the service. Thus, attendance at the second workshop was low, with only 12 attending.

Workshop evaluations

Table 1 presents the results of the two training workshop evaluations. These data show that participants considered the training relevant to their individual and service/team practices, they had high confidence and intention to use Bridges, and all but one participant would recommend the workshop to others. The themed responses to the open-ended questions are shown in Table 2 (initial training workshop) and Table 3 (second training workshop).

Second training workshop data

When workshop attendees were asked how Bridges could be sustained within their service, the main suggestions were refresher courses and new staff training resources, as shown in Table 4.

In-depth qualitative interviews

At the time of the first training workshop, 24 of the 51 attendees consented to be interviewed. However, subsequent to

Table 1

Evaluation of First and Second Workshops

Questions	First workshop (*n* = 48/51)		Second workshop (*n* = 12/12)	
	Median	Range	Median	Range
Rate training in terms of relevance to your role. (1–4: "not at all" to "very" relevant)	3	2–4	4	3–4
Rate the training in terms of relevance to your team/service. (1–4: "not at all" to "very" relevant)	4	2–4	4	3–4
How confident do you feel right now to use Bridges in your practice? (1–8: "not" to "very" confident)	7	4–10	8	5–10
What is your intention to use Bridges in your role after today? (1–10: "no" to "every" intention)	8	4–10	8.5	4–10
How confident do you feel right now, to explain the concept of Bridges and self-management support to colleagues who were not at the training today? (1–10: "not" to "very" confident)	7	3–9	8.5	5–10
Do you feel that the workshop will enhance your practice?	Yes = 44 No = 1	Maybe = 2 DNA = 1	Yes = 11 No = 1	
Would you recommend this workshop to a colleague?	Yes = 47 No = 1			

Note. DNA = did not attend.

Table 2

First Workshop Attendee Perspectives of Impact on Their Practice and Foreseeable Barriers to Implementation of Bridges (N = 51)

How might the workshop enhance your practice?		What barriers do you forsee in implementing Bridges into practice?	
Theme	Illustrative quotes	Theme	Illustrative quotes
Confidence to empower a patient to self-management	"Provided clarity to ensure I allow patients to self manage, increased my awareness of how I ask questions, what I ask and how I influence a patient's self-efficacy and ability to manage self." "I'll be more confident to step back and encourage family and PT self-management."	Not all staff trained	"Not all staff on ward and in community have been trained." "Not all staff encouraging/educating patients to use this."
		Consistency and sustainability	"How will consistency, sustainability, and measuring progress be managed?" "Slipping back into "business as usual" rather than continuing the change."

How might the workshop enhance your practice?		What barriers do you forsee in implementing Bridges into practice?	
Theme	Illustrative quotes	Theme	Illustrative quotes
Improved communication	"Improve communication and relationship with person and family." "The use of different words to help clients, allowing more honest/direct/relevant communication pathways to develop between myself and my clients."	Staff confidence to use approach	"Staff getting to a level of confidence to be fluent when using the workbook."
		Patients with cognitive impairments, aphasia or living alone	"Difficult for those with no family/friends. (I have many isolated older adults with aphasia living alone at home)." "In my area - advanced age/cognition decline/multiple medical comorbidities/individual and family expectations on the healthcare system."
What we do in practice already	"Already enforces what we as occupational therapists do." "It reaffirms my solution-focused practise, but I need to listen to the client to write a goal that they will own." "A lot of these techniques are really social work."	Clients not wishing to self-manage	"Clients dependent on outside/formal assistance and how it benefits their lives." "Age of our clients – maybe resistant to change and/or self motivation." "Needs Assessment and Service Coordination service is a needs not want/wish, service – already have a restorative approach – how will we "unlearn" this?" "Patient expectations of a cure, forgetting they are ageing." "Patients wanting to be 'done to'."
New skills and ideas	"Looking at a patient in a different way." "Self reflection on how I interact and try to be less didactic." "To promote self-reflection of clients who are poorly motivated."	Finding suitable clients	"Not working much with patients with stroke." "A long-term condition approach would be better." "Low number of patients with stroke – but the principles can be used with patients with long-term conditions."
		Not all staff on board	"Personal beliefs about this programme – not all engaged in the philosophy." "Change resistance – afraid of change." "Staff lack of motivation." "Staff inflexibility in their practice."
		Time	"Limited time for staff." "Time constraints and pressure on staffing."

Table 3

Second Workshop Attendee Perspectives of Impact on Their Practice and Foreseeable Barriers to Implementation of Bridges (N = 12)

How might the workshop enhance your practice?		What barriers do you foresee in implementing Bridges into practice?	
Theme	Illustrative quote	Theme	Illustrative quote
Person-centred care	"Focusing on what the patient wants instead of what the health practitioner wants. If we have goals for patients, they are less likely to achieve them. If they have their own goals, they are more likely to achieve them and achieve them faster." "Changing roles with successful collaborative working of multidisciplinary team during patient journey to empower patient. Giving patient and families belief to change or adopt to manage/change new health status."	Resistance to change	"That the team will not take it on. Only a few will do it." "Staff reluctance for change." "Personal beliefs from healthcare profession cultural background."

How might the workshop enhance your practice?		What barriers do you foresee in implementing Bridges into practice?	
Theme	Illustrative quote	Theme	Illustrative quote
	"Working on the things that are meaningful for the patient. Not wasting time on things they are not focussed on." "Supporting patients to think about what they want to achieve." "Workshop also highlighted not to dismiss this approach for patients who might have cognitive/ communication difficulties." "Decrease reliance on health professsionals in the long term. Improve patient confidence." "Ensure care is meaningful to patient. Highlighting importance of identifying and recognising goals/ meaningful activities for patients."		
Insightful but difficult to achieve	"Given me insight into approaching rehab from a different perspective. For me, this is a work in progress. This is more difficult for me to achieve as I am an assistant, not a registered health professional."	Sustainability	"Sustainability, i.e., people who have been trained leaving their jobs." "Training for new staff." "Slipping back into old ways." "Return to practice as normal with time pressures." "Losing others who have trained and who can offer support."
This is what we do anyway	"Reinforcement of social work practice." "Reinforced my practice."	Constant change	"I think that as a hospital, lots of different things have been tried in other countries then brought here, possibly we are all tired of new concepts."
Enhanced skills to support self-management	"Bridges helped me to encourage self-management for our patients. It takes time but improves outcomes for patients, helped me focus on the patient's goals." "The use of empowerment." "Focus on patients' strengths." "Using strategies of self-management with patients. Allowing patients to self reflect on own capabilities." "Promote ability to really know what is important to the person. Identify those who would be able to achieve this with less versus more input and keeping people enagaged and motivated on things they love."	Strong influence of the medical model of healthcare	"Overall "medical model" of hospital and of initial training."
		Time	"For some people."

the second workshop, only seven participants (five females and two males) were available: two physiotherapists, one dietitian, one occupational therapist, one manager, one social worker, and one nurse. Data analysis identified three key themes: *valued but we do this anyway*, *barriers to implementation*, and *sustainability*. Each theme, with relevant supporting quotes, is described below (names are pseudonyms).

Valued but we do this anyway

All participants emphasised they valued the Bridges concepts and spoke of how the language in the DHB had changed since the training to reflect that of self-management. Mary (physiotherapist): "So many of the conversations I have had [commenting on the impact of the initial training on staff], it comes down to two words – communication and language".

Table 4

Second Training Workshop Attendee Feedback (N = 12)

Ideas for sustainability
Orientation package for new staff: ... "We use the Bridges approach to self-management – this is what it means ..."
Annual 2 hr refresher training
Training resources on the HealthLearn forum
Resources to include videos and stories
Some staff become trained as Bridges trainers
Need staff champions to drive Bridges
Mandatory peer review
Change language used in team meetings
Change goal-setting process
Patients' goals should be visible to all, so all can assist in their achievement – perhaps a "goal book" at end of bed
For non-stroke patients, a goal-setting/reflection book (staff were only provided with the Bridges workbook to give to patients)
Working more as a team
Change culture of the ward
Discussion in relation to other programmes within the service and their interaction with Bridges, e.g., falls prevention, the Calderdale framework

Rose (manager) elaborated: "The highlight is seeing that change of mindset for those professionals … it's certainly highlighted to our community workforce around the importance of self-management". Participants spoke of how their practice changed, for example, John (charge nurse):

> I am more aware now than I used to be, we have always tried to encourage people to be independent, but then, the training helped me with the use of my words, how to encourage the patients to self-manage and to be independent and try to problem solve.

Mary (physiotherapist) spoke of how the approach was feasible even for those with aphasia: "The speech and language therapist took it to her communication group and created an incredible amount of excitement there."

However some participants felt they already employed these techniques in their practice, as described by Lucy (social worker): "I think the whole is a really good idea, I guess for social workers a lot of it is stuff that we are doing anyway, so it's not new to us." Sophie (dietitian) reiterated this point: "I didn't feel like I changed too much with my practice." Sophie also went on to report that some staff attending the initial workshop had struggled to see the relevance of Bridges to their practice: "In the training, not everyone was on board either, like you could see that lots of people were, 'Why am I here, I'm losing a day', you know, I'm already doing this with my patients." Rose (manager) agreed that some staff did not link the new theory learnt to their current practice:

> People didn't feel that they were treating stroke patients so there was that disconnect … some people didn't see the benefit of what we were trying to sell in the sense of the self-management principles they can use for any long-term condition.

Barriers to implementation

Several barriers to implementation were identified, namely limited numbers of patients with stroke, Bridges differing to usual professional training, conflicting concepts from other programmes, a task-orientated hospital culture, resistance to change, and that the approach takes more time.

Some participants said they were unable to implement Bridges due to a lack of opportunity in the area they worked in, for example Lucy (social worker) stated: "Unfortunately I don't get an opportunity to use it and I won't in palliative care either." Becky (occupational therapist) agreed: "We've got such small numbers of stroke patients coming through … we would need to move it on to other long-term conditions too."

Sophie (dietitian) talked about how Bridges differed from how they were trained: "We all get trained in a more, medical model rather than a patient-centred model." This concern extended to their role as a professional in a particular field, particularly for novice practitioners, as Mary (physiotherapist) pointed out: "Some people struggled with the concept because they were still establishing themselves in their professional roles and the identity that gave them, and were still working on their own skills and knowledge."

Participants felt that other programmes run at the same time as Bridges potentially caused conflict. Concern was expressed at how enabling patients to set their own goals could be risky, for example, if the patient chose a goal of walking without their stick and chose to do this whilst they were still considered a falls risk, an example of how Bridges was perceived to conflict with the current falls prevention programme. These thoughts are clearly described by Becky (occupational therapist): "We run a falls prevention programme and we're running Bridges and we know that as we allow patients to test their boundaries, which programme comes first? Are there going to be consequences [for them as health professionals]?"

Participants spoke about how their usual practice was task orientated, and this was unhelpful for promoting patient self-management, as described by Becky (occupational therapist): "The culture in AT&R, as much as it's supposed to be

rehabilitation, there's still that ... underlying culture of being task orientated, so everyone has to have a shower today, even if they only shower once a week at home."

Participants perceived that including Bridges into their practice would be time consuming, especially if concurrently implementing other new interventions. Becky (occupational therapist) stated: "It gets quite difficult when you are implementing a new model … trying to be done on top of everything else and all the competing agendas." And as Lucy (dietitian) pointed out: "There's too much … we can't remember it all, and something else comes along, and we forget about the last thing." Additionally, participants spoke of the reluctance of some staff to change their practice, as articulated by Rose (manager): "That's what you get [with] any kind of change that you're trying to make, you always have that small group that you know, sort of question what you're doing and why you're doing it."

The scope of staff trained was considered too broad, and that a more narrowly targeted training programme would have increased the use of Bridges, for example, training only staff from the AT&R ward. Additionally, some thought that the implementation of Bridges should have extended beyond stroke to include other long-term conditions, as stated by Sophie: "I think that it's a focus that should be with everything not just stroke."

Sustainability

Sustainability of the approach was considered important by study participants. Continued training and support, on top of the initial training, for example, as part of an induction package or as part of original professional training was suggested. As Becky (occupational therapist) said: "It is something that has to be embedded over time and it's a cultural change and it's about making sure that the staff who have received the training have ongoing support and supervision".

Staff turnover during the project was high, a challenge to maintaining the approach, as explained by Rose (manager):

> You're constantly getting staff changes. So even with an occupational therapy workforce, that workforce that was down there at the start of training they um, all decided to go overseas together so they we've got a whole workforce there now that only two or three have done that initial training.

Useful sustainability strategies included peer review sessions and champions. As described by Mary (physiotherapist): "Peer review is a great opportunity to actually have somebody come in and peer review the language and interaction you have with individuals. That is incredibly valuable." John (charge nurse) also felt that not just having champions but modifying their role to enable more time to devote to championing would be beneficial: "Having a person who will just focus on Bridges."

Mary went on to explain how the uptake of Bridges will slowly grow: "I was at a local community event and ran into somebody who had been involved with the speech and language therapy group and her perception was that this process was fabulous, amazing and well and truly worth engaging in."

DISCUSSION

Overall, our integrated data demonstrated the potential acceptability of Bridges to staff in the targeted DHB but identified challenges and limitations to adopting the approach. The key outcome was a raised awareness across the DHB of the concept of self-management support. Although many staff valued and, at least at a superficial level, bought into the philosophies of Bridges, exhibiting both coherence and cognitive participation, changing actual clinical practice appeared difficult – findings like those reported by Jones and Bailey (2013). Bridges' philosophies, such as shared decision-making, and empowering the patient to lead their own recovery and rehabilitation, were said by our participants to be different to that of the long-engrained medical model of care, where health professionals are viewed by themselves, the patients and the public as the experts, and thus the people to make all decisions. This long-embedded way of practice, in which many staff had been trained, was considered deeply rooted and a place of comfort to work from in times of stress or busyness. As reported by others, whilst rhetoric around therapeutic relationships and person-centred care is cognitively engaging, in the practical context this often disintegrates into inadvertent fostering of dependency and undervaluing of patient personhood (Ahmad et al., 2014; Clark et al., 2018; Eaton et al., 2015; Satink et al., 2015).

Whilst staff in our study verbally espoused the value of Bridges, this did not seem to translate into active engagement in training and learning support. The support provided between workshops by the trainers was minimally utilised, and attendance at follow-up training was not prioritised by staff, with only 23% of the staff who were initially trained attending. Possible reasons for low attendance at the follow-up workshop included significant staff turnover as well as movement of key staff and potential champions into different roles during the intervening weeks.

A further possible reason for poor engagement was what workshop participants referred to as a "resistance to change", a known phenomenon within healthcare and one which is complex and multifactorial (Landaeta et al., 2008). Changing health professional practice behaviour is difficult and requires consistent messaging, training, support, and modifying peer group interactions as well as consistent management expectations and support (Johnson & May, 2015; Levack et al., 2011; Mudge et al., 2015; Norris & Kilbride, 2014). Johnson and May (2015) hypothesise that successful behaviour change interventions may be those that emphasise both the coherence of (making sense of) the intervention and how the actual response to this (collective action) is measured up to the expectations of external observers or project owners (reflexive monitoring). Behaviour change requires modifications to organisational structure and purposive monitored action, and not just a change in staff beliefs and intentions. In our study, although we gave much attention upfront to coherence and cognitive participation, we possibly did not give enough attention later to collective action and reflexive monitoring. However, our findings are no different to other studies attempting to implement self-management programmes into

practice (Kennedy et al., 2013, 2014; Sunaert et al., 2011). For example, a trial undertaken in UK general practices reported strong managerial support, and relevant and acceptable training strategies but "failed" at implementing the intervention into routine practice (Kennedy et al., 2013, 2014).

For our Bridges trainers, providing learning support for staff was challenging. Various strategies were adopted to support staff between the two training workshops, but without consistent managerial expectations that these initiatives be utilised, there was limited engagement. The most successful strategy was having local champions exemplified by two senior staff on the AT&R ward, who facilitated multiple ways of embedding Bridges into practice (emphasising collective action). Further, staff, especially social workers and occupational therapists, who said "we work this way already", were able to be role models in the training workshops, replicating findings of Jones and Bailey (2013).

Consensus from consultation with management was to focus on stroke and train all staff involved in the stroke care pathway. This may have been the wrong decision. Whole team training is advocated, as inter-professional exchanges can facilitate a shared understanding of self-management support (Jones et al., 2017; Kulnick et al., 2016; Jones & Bailey, 2013), but it is a large undertaking, requiring multiple workshops. Furthermore, as a relatively small DHB, whilst many staff work with stroke survivors, these interactions may be infrequent for some due to the relatively low numbers of stroke survivors seen by the service. Thus, some staff questioned the relevance of the training to their usual work and had few opportunities to use Bridges in practice, at least with stroke survivors. The philosophy and principles of Bridges are applicable to people living with any long-term condition, and the development of Bridges has been applied across different healthcare settings (Kulnik et al., 2016). We acknowledge that a more general approach, inclusive of all patients with complex long-term conditions, would have increased the relevance of Bridges for more staff, especially as the DHB is too small to have specialist services in any one condition, thereby enhancing coherence, cognitive participation, and collective action.

Retrospectively, we should have focused training in only one clinical area, such as AT&R, and with experience of success in one area, possibly permeating to other areas (improving coherence and reflexive monitoring). Previous studies have found that teams which successfully integrate Bridges into their working practices appear to have a flat hierarchical structure (Jones et al., 2015; Mäkelä et al., 2014, 2019), which is thought to create a more open and supportive environment, enabling more innovative ways of working. The AT&R team at the DHB appeared to represent this sort of environment, whereas the community-based teams appeared less connected.

Barriers perceived by study participants to their implementation of Bridges included taking too much time; difficulty for use with patients with severe physical, cognitive or communication impairments; reduced staff confidence; and, possibly, too much focus on the Bridges workbook.

Taking too much time was a theme reiterated across all data collected, and indeed, reported by many studies evaluating Bridges (Kulnik et al., 2016; Jones & Bailey, 2013; Mäkelä et al., 2014, 2019; McKenna, Martin, et al., 2015; Satink et al., 2015) and other self-management programmes (Ahmad et al., 2014; Ross et al., 2019). Following training, it may initially take time and effort to consciously apply self-management support, as it requires health professionals to work in a different way until it becomes a natural part of practice. However, once self-management principles are embedded routinely into everyday patient interactions, it should be more time efficient (Jones & Bailey, 2013).

The perception that Bridges would be challenging to implement if patients had severe physical, cognitive or communication impairments aligns with other studies (Mäkelä et al., 2014, 2019; McKenna, Martin, et al., 2015; Satink et al., 2015). In our study, however, there was a successful example of a speech and language therapist using Bridges in her aphasia community group. She incorporated several strategies into the group, including facilitated goal setting, joint reflection (within the group), peer support, and enhancement of self-efficacy via vicarious experience (group members telling of their successes). Previous studies support the inclusion and benefits of stroke survivors with cognitive and communication dysfunction in self-management programmes (Cadilhac et al., 2016; Nichol et al., 2019).

Building confidence for all staff, irrespective of their level of professional experience, to use Bridges was noted in our data. For example, junior staff may not be confident using Bridges if the patient's goals appeared at odds with ward protocols or safety standards. A collective team approach is required so that senior staff can support junior staff in the application of Bridges.

For some, the workbook became the focus of the intervention, despite highlighting in training that it was only an assistive tool. Some staff provided the book alone to patients without the accompanying interactive support to develop the patient's self-management skills. Reliance on tools, such as workbooks, rather than on skilled clinical encounters, has been highlighted as an issue in previous self-management support and shared decision-making studies (Légaré & Thompson-Leduc, 2014; Mäkelä et al., 2019). In current training, the Bridges workbook is now only introduced in the second training workshop, not the first.

Suggested strategies to sustain Bridges within the service were (a) the training of new staff and regular refresher workshops for those already trained; (b) having multiple available sources of training, such as online packages; (c) peer review or peer support; and (d) champions. These findings reflect those of previous studies (Jones & Bailey, 2013; Mäkelä et al., 2014, 2019). The champions were possibly the key factor, and these staff have subsequently been provided with more support, mostly notably time and resources to train other staff.

A limitation of our project was the low engagement of staff in its evaluation component. We endeavoured to collect data via in-depth interviews, but perhaps these were perceived too onerous and time consuming, or possibly a little intimidating.

In future, alternative methods of collecting data could be considered, such as short online surveys, brief informal interviews, participant diaries, or attending and recording discussions in team meetings. Another approach would be to use an action participatory approach to enable staff to suggest how they would prefer data to be collected (Loewenson et al., 2014). Although engagement in the in-depth interviews was low, the interview findings were congruent and supportive of the data collected from other data sources.

Our learnings from this project, which will guide our future research into the implementation of Bridges in New Zealand, were:

1. Implementing a new intervention takes time and requires sustained support.
2. Start by training a smaller, contained inter-professional team.
3. Senior managers and those with influence need to consistently communicate to staff their expectations and value of the intervention.
4. Identify early adopters and champions of the approach, and ensure they get concentrated training, resources, and managerial support.
5. Whilst acknowledging the importance of and maintaining our input into coherence and cognitive participation, in future we would attend far more to collective action and reflexive monitoring. On reflection of the difficulty of changing practice, future research in self-management training should also focus on entry level health professional training.

CONCLUSION

We found Bridges to be conceptually acceptable and contextually appropriate in a small New Zealand DHB, and our implementation of the approach raised awareness of self-management support across the service. Changing clinical practice takes time, and staff need to not only develop their knowledge in the area of supporting patient self-management, but they also need to build their own skills and self-efficacy to do this. These processes require managerial support, endorsement, and resources. The learnings from this study can inform future implementation of self-management support programmes for people with long-term conditions.

KEY POINTS

1. The Bridges stroke self-management approach was found to be contextually appropriative and acceptable to a New Zealand stroke service.
2. Health professionals need time and opportunity to develop knowledge, skills, and self-efficacy to support patient self-management.
3. Changing clinical practice requires managerial value, encouragement, and sustained support.

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PERMISSIONS

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Encounters between Physiotherapists and Clients with Suicidal Thoughts and Behaviours: A Narrative Literature Review

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ABSTRACT

This narrative review examined the literature relevant to encounters between physiotherapists and clients with suicidal thoughts and behaviours (STBs). The review was conducted in response to a growing international movement to make suicide prevention everyone's business. The *Framework for Suicide Risk Assessment and Management for NSW Health Staff* (New South Wales Department of Health, 2004) informed the review as it requires all New South Wales Department of Health practitioners, including physiotherapists, to be able to assess and manage clients with STBs. The review identified 23 peer-reviewed articles and four non-peer-reviewed articles that mentioned encounters between physiotherapists and clients with STBs. The results suggest that physiotherapists may encounter clients with STBs given the conditions they manage, the increased risk of suicide associated with these conditions, and the pattern of contact between health professionals and clients with STBs. Future research is required to explore the prevalence of STBs among physiotherapy clients, the experiences of physiotherapists who have identified clients with STBs, and whether physiotherapists are adequately trained and competent in suicide risk assessment.

McGrath, R. L., MacDonald, J. B., Verdon, S., Parnell, T., & Smith, M. (2021). Encounters between physiotherapists and clients with suicidal thoughts and behaviours: A narrative literature review. *New Zealand Journal of Physiotherapy, 49*(2), 70–81. https://doi.org/10.15619/NZJP/49.2.03

Key Words: Self-Injurious Behaviour, Suicide, Physical Therapy Specialty, Physiotherapy

INTRODUCTION

The current review was conducted in response to a growing international movement to make suicide prevention everyone's business (World Health Organization, 2010). More specifically, the review was inspired by the *Framework for Suicide Risk Assessment and Management for NSW Health Staff* (New South Wales Department of Health [NSW Health], 2004). NSW Health (2019) is the largest public healthcare system in Australia. The *Framework for Suicide Risk Assessment and Management for NSW Health Staff* (NSW Health, 2004) is of significance as it *requires* all NSW health practitioners, including physiotherapists, to be able to conduct a preliminary suicide risk assessment (SRA). A preliminary SRA involves a brief psychiatric assessment and an assessment of suicide risk; these assessments require practitioners to directly ask the client about their suicidal thoughts (NSW Health, 2004). According to the framework, all NSW Health practitioners must be provided with training in SRA that is "consistent with their experience and exposure to people at risk of suicide" (NSW Health, 2004, p. 6).

People most commonly self-refer to physiotherapists for the diagnosis and treatment of conditions that cause pain and loss of function/mobility (McRae & Hancock, 2017). According to the interpersonal theory of suicide (Joiner, 2005) and the three-step theory of suicide (Klonsky & May, 2015) the factors involved in the pathway to suicide are pain, hopelessness, and social disconnectedness (which is a combination of low belongingness and high burdensomeness). Pain and loss of physical function can lead to suicide via various pathways, such as increasing feelings of burdensomeness (Conejero et al., 2018; Dempsey et al., 2012; Eisenberger, 2012; LeRoy et al., 2018). These models highlight the importance of investigating the relationship between poor physical health, physical pain, and suicidal thoughts and behaviours (STBs). By extension, these models also suggest that physiotherapists may come into contact

with people with STBs. For this review, STBs were defined as a continuum ranging from suicidal ideation to death by suicide (Littlewood et al., 2017).

Poor physical health may not just correlate with STBs, but also be a primary motivator of STBs (Fegg et al., 2016). Fegg et al. analysed the suicide, medical and police notes of 1,069 suicide deaths in Germany between 2009 and 2011. The authors concluded that 18.9% of individuals completed suicide due to physical reasons. Clapperton, Newstead, et al. (2020) found that for people with stable depression, poor physical health served as a stressor, exacerbating the person's depressive symptoms and STBs, which then resulted in suicide. It appears that there are two groups of people with physical health issues at risk of completing suicide: (a) people with diagnosed mental illness and physical health problems, which act as a stressor; and (b) people with physical health problems and no diagnosed mental illness (Clapperton, Bugeja, et al., 2020). People with physical health problems and no diagnosed mental illness tend to be older and less likely to experience interpersonal, personal and situational stressors than other groups who completed suicide (Clapperton, Bugeja, et al., 2020). Incomplete suicides may also result in life-changing physical conditions (Papadakis et al., 2014). For example, incomplete high fall suicides may result in paraplegia and brain injury (Papadakis et al., 2014; Papadakis et al., 2020). Physical injuries sustained during suicide may also develop into chronic pain conditions (Hiraiwa et al., 2014). Overall, there is a substantial body of convergent evidence suggesting that poor physical health is both (a) a risk factor for suicide in people regardless of mental illness diagnosis and (b) a sequela of incomplete suicide.

The three-step theory of suicide posits that the first step in the development of suicidal ideation is pain and that this pain is not limited to psychological pain (Klonsky & May, 2015). Physical pain can directly contribute to suicidal ideation and indirectly through its relationship with psychological pain (Pachkowski et al., 2020). The association between physical pain and suicide is theoretically mediated by "helplessness/hopelessness about the ability to cope and about the chances of future relief from pain" (Tang & Crane, 2006, p. 582). A meta-analysis of 31 studies found that people with physical pain were more likely than those not experiencing physical pain to have current and lifetime suicidal ideation, suicidal plans, incomplete suicide, and complete suicide (Calati et al., 2015). Fishbain et al. (2009) is the only study to have compared the prevalence of STBs amongst people experiencing acute and chronic pain; they found that people with acute or chronic pain are both at an elevated risk of suicide when compared to pain-free controls.

The relationship between physical pain and the development of STBs may impact physiotherapy practice given that a high proportion of those seeking physiotherapy services experience pain (McRae & Hancock, 2017). A meta-synthesis of 49 articles investigating the effect of back pain on people's lives found that feelings of depression and hopelessness were common among people with back pain, and there was evidence of suicidal ideation among some participants in these studies (Froud et al., 2014). Petrosky et al. (2018) examined a random sample of 200 people who completed suicide, had chronic pain, and who had left a suicide note. Of the 95 cases where the content of the suicide note was available to be studied, Petrosky et al. found that pain was a motivator in the individual's suicide in 64 cases (67.5%).

Due to the relationship between suicide and poor physical health and pain, it was expected that physiotherapists would encounter clients with STBs (Calati et al., 2015; Fässberg et al., 2016). The aim of this review was to synthesise the existing literature which mentions contact between physiotherapists and clients with STBs, and provides insight into the experiences of physiotherapists with clients with STBs. The research questions were:

1. What evidence is there for contact between physiotherapists and clients with STBs?
2. What is known about the experiences of physiotherapists with clients with STBs?

The intention of this review was to (a) highlight the significance of this practice issue for physiotherapists, (b) provide a foundation for future research, and (c) inform health policy.

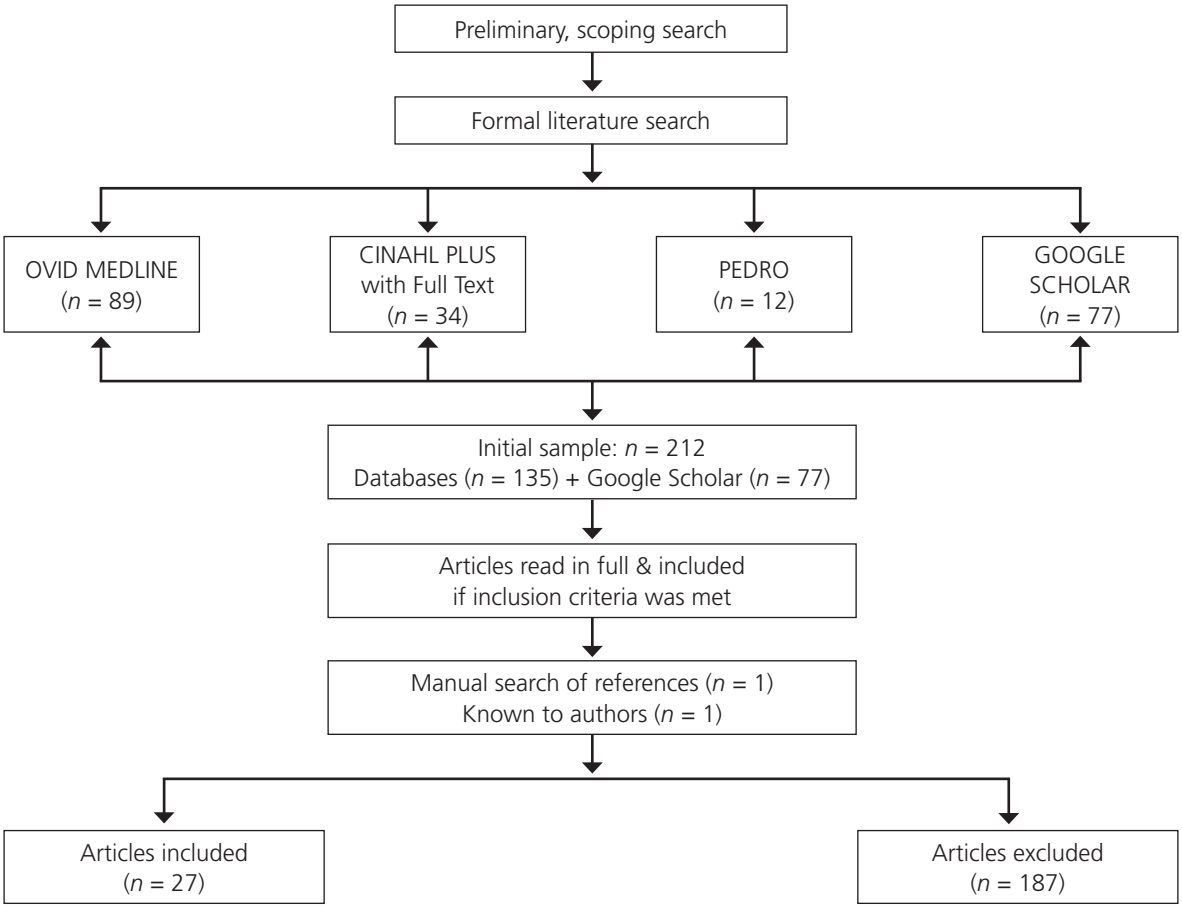
METHODS

A preliminary scoping search of the literature revealed: (a) a paucity of empirical studies which *specifically* investigated contact between physiotherapists and clients with STBs, and (b) that the focus and methods of the existing literature appeared diverse and piecemeal in nature. Based on the preliminary search, a narrative review approach informed by an interpretivist theoretical framework was chosen. While a systematic review approach was considered, the narrative review approach is "better suited to addressing a topic in wider ways" (Baethge et al., 2019, p. 2) and offers "greater flexibility in searching and synthesizing articles" (Paré & Kitsiou, 2017, p. 172). This flexibility in searching and synthesising articles was essential as multiple types of articles, including commentaries, editorials, and research studies, would all eventually be included within the review. However, in line with recent trends (Ferrari, 2015; Paré & Kitsiou, 2017), some of the methodological features of systematic reviews were adopted to enhance the transparency of this narrative review (Figure 1). While the method described below resembles that of a systematic review, it is important to emphasise that the review was conceptualised as a narrative review, which meant that any article that the research team believed would provide insight into the research topic would be included. This method is consistent with Paré et al. (2015), who stated that narrative reviews tend to be opportunistic and survey literature that is readily available to the researchers.

The literature search was conducted in October 2020. The search terms physiotherap*, physical therap*, and suicid* were used to find potentially relevant articles. Articles were included if (a) they were available in English; and (b) explicitly discussed or mentioned the contact between a physiotherapist and a client with STBs, or discussed the experiences of physiotherapists working with clients with STBs. The databases Ovid Medline®, CINAHL Plus with Full Text, and PEDro were selected, with 135 articles identified through the search of the literature. The full text of each article was downloaded, as encounters between physiotherapists and clients with STBs were often only briefly mentioned.

Figure 1

Search Strategy of the Narrative Literature Review Process



The search engine Google Scholar was also used to identify relevant articles, particularly grey literature that is not indexed by traditional databases (Haddaway et al., 2015). Although Google Scholar should not be used as a standalone resource, Haddaway et al. (2015) argues that it is a "powerful addition to other traditional search methods" (p. 1). Due to Google Scholar's limited search functionality, such as the inability to nest query terms and to recognise truncation symbols (Ortega, 2014), seven searches were performed using different combinations of keywords and inclusion criteria (i.e., keywords "in the title of the article" or "anywhere in the article"). In total, 11,232 results were returned. The number of results was significantly larger than the search of the traditional databases because Google Scholar identified any article that had the keywords "physiotherap*" or "physical therap*" in at least one of the author's affiliation or in the reference section, but not necessarily in the content of the article. Haddaway et al. noted that some reviewers opt to screen the first 50 to 100 results to manage a large number of results, as Google Scholar uses a ranking algorithm for relevance in regard to the search terms (Rovira et al., 2019). For this review, screening articles was not possible as it was often necessary to read each identified article in full to find any mention of contact between physiotherapists and clients with STBs. As a compromise, the first 25 results of each of the searches were downloaded and read in full. In total, 77 articles were downloaded and read in full as not all searches of Google Scholar returned 25 or more results.

The full text of the 212 articles identified (databases, *n* = 135; Google Scholar, *n* = 77) were read in their entirety so as to not miss any mention of encounters between physiotherapists and clients with STBs. The references of all 212 articles were manually screened, leading to the inclusion of one article (Agence France-Presse, 2007). One additional article known to the authors was included due to its relevance (Doesburg, 2016). The study by Doesburg was discovered through a Google Scholar search during the preliminary search phase and does not appear to be indexed by any major database.

RESULTS

Table 1 provides an overview of the 27 articles included in this review. Articles from 13 countries were identified from as early as 2003, indicating that this is a topic of international relevance; 23 articles were peer-reviewed; and case studies were the most common research design (*n* = 11).

Table 1

Summary of Studies Describing Physiotherapists Experience of and/or Contact With Clients With Suicidal Thoughts and Behaviours

Study	Country	Research design	Sample (*n*)	Focus of the study	STBs described	Connection to physiotherapists
Edmunds and Gafner (2003)	United States	Case study	Patients who were refugees (2)	Combined hypnotic ego strengthening and zero balancing treatment	Non-fatal attempt(s)	The patient had participated in physiotherapy
Gyllensten et al. (2003)	Sweden	Qualitative case study	Patients with schizophrenia (6) and general psychiatric outpatients (5)	Patient experiences of body awareness therapy in psychiatric physiotherapy	Ideation	The programme was led by physiotherapists
Berg et al. (2006)	Norway	Survey	Police officers (3,272)	Help-seeking behaviours	Ideation	Participant contact with physiotherapists was assessed
Agence France-Presse (2007)	Iraq	Newspaper article (not peer-reviewed)	Physiotherapist (1)	Self-immolation in Iraqi Kurdish women	Non-fatal attempt(s)	Physiotherapist reported that patients would confide in her
Taylor et al. (2007)	Australia	Interviews	South Australian general population (5,037)	Self-reported prevalence of suicidal ideation and associated risk factors	Ideation	Participant contact with physiotherapists was assessed
Berg (2011)	Norway	Case study	Patient with Parkinson's disease and comorbid depression (1)	Electroconvulsive treatment	Ideation	The patient had participated in physiotherapy
Ekerholt (2011)	Norway	Interviews	Patients who underwent psychomotor physiotherapy (10)	Patient experiences of treatment	Ideation	The patients had participated in physiotherapy
Malcolm and Scott (2012)	Germany	Anecdotal editorial	Football player (1)	The role of sports medicine practitioners in the assessment and management of STBs and mental health problems	Completed suicide	The individual was reported to have a close relationship with the club physiotherapist
Cheeks et al. (2014)	United States	Case study	Patient with a worsening cardiac condition (1)	Clinical decision-making	Ideation	Case was managed by a physiotherapist

Study	Country	Research design	Sample (*n*)	Focus of the study	STBs described	Connection to physiotherapists
Kowal et al. (2014)	Canada	Pre- and post-treatment evaluation	Patients with chronic pain (250)	Effectiveness of an interdisciplinary rehabilitation programme to reduce suicidal ideation	Ideation	Physiotherapists were part of the interdisciplinary management
Lascelles (2014)	United Kingdom	Opinion piece referencing unpublished research findings (not peer-reviewed)	Physiotherapists (5)	Role and training of physiotherapists in suicide prevention	Ideation	Participants in the unpublished study
Marusic et al. (2014)	Croatia	Case study	Patient with bipolar disorder who intentionally overdosed on valproic acid (1)	Neuropathy as a result of intentional overdose	Non-fatal attempt(s)	The patient had participated in physiotherapy
Nielsen et al. (2014)	Australia	Interviews	Physiotherapists (8)	Implementing cognitive-behavioural interventions	Assessing suicide risk	Participants in the study
Shetye et al. (2014)	India	Case study	Patient with delayed onset neuropathy and recurrent laryngeal nerve palsy secondary to organophosphate insecticide poisoning (1)	Role of physiotherapy for delayed onset neuropathy	Non-fatal attempt(s)	The patient had participated in physiotherapy
Doesburg (2016)	New Zealand	Magazine article (not peer-reviewed)	Physiotherapists (*n* not stated)	Guidance to physiotherapists performing suicide risk assessments	Assessing suicide risk	Physiotherapy New Zealand members reported contact and wanted guidance
Lo Pardo et al. (2016)	Italy	Case study	Patient with delayed neuropsychiatric syndrome secondary to carbon monoxide poisoning (1)	Hyperbaric oxygen therapy	Non-fatal attempt(s)	The patient had participated in physiotherapy
McVey et al. (2016)	United Kingdom	Forum	Members of the general public and health professionals (84)	Suicide prevention	Assessing suicide risk	Participants in the study
Brockington (2017)	International	Literature review	Research articles (15)	Suicide and filicide in postpartum psychosis	Non-fatal attempt(s)	The participants' contact with physiotherapists was assessed

Study	Country	Research design	Sample (*n*)	Focus of the study	STBs described	Connection to physiotherapists
Cottrell et al. (2017)	Australia	Interviews	Physiotherapists (15) and other health professionals (11)	Perception of telehealth in a neurosurgical and orthopaedic physiotherapy screening clinic, and multidisciplinary service.	Assessing suicide risk	Participants in the study
Hickey et al. (2017)	United States	Case study	Patient with shoulder pathology and was a military sexual abuse survivor (1)	Patient-centred perioperative care plan	Non-fatal attempt(s)	The patient had participated in physiotherapy
Miller et al. (2017)	Canada	Case study	Patients of a chronic pain self-management programme (6)	Patient responses and changes as a result of programme participation	Ideation	The programme was led by physiotherapists
Sola and dos Santos (2017)	Brazil	Literature review and case study	Patient with an intrathoracic dislocation (1)	Intrathoracic fracture-dislocation of the humerus	Completed suicide	The patient had participated in physiotherapy
Omura and Osorio (2018)	United States	Case study	Patient with a traumatic brain injury (1)	Premenstrual dysphoric disorder	Ideation	The patient had participated in physiotherapy
Dragesund and Øien (2019)	Norway	Focus group	Physiotherapists (5)	Norwegian psychomotor physiotherapy for patients with long-lasting musculoskeletal pain	Client ideation	Participants in the study
Tepper et al. (2019)	United States	Anecdotal magazine article (not peer-reviewed)	Patient with chronic back pain (1)	Role of physiotherapist in the patient recovery	Non-fatal attempt(s)	The patient had participated in physiotherapy
Herdman et al. (2020)	United Kingdom	Survey	Patients of a hospital outpatient neuro-otology clinic (954)	Feasibility of digital mental health screening	Ideation	The clinic was staffed by physiotherapists
McGrath et al. (2020)	Australia	Focus group and interviews	Physiotherapists (9)	Experience of physiotherapists with clients with STBS	STBs and assessing suicide risk	Participants in the study

Note. STBs – Suicidal thoughts and behaviours.

Contact between physiotherapist and clients with STBs

Three studies provided data on the prevalence of STBs amongst people accessing physiotherapy services. Herdman et al. (2020) and Taylor et al. (2007) both found a point/one-month prevalence of STBs of 5.4% among physiotherapy clients, but through very different methods. Herdman et al. examined data from clients who experienced STBs and attended a hospital outpatient neuro-otology clinic over a one-year period in London, staffed by physiotherapists. In contrast, Taylor et al. drew on data from a representative sample of the general South Australian public. Comparatively, Kowal et al. (2014) found that 34.4% of participants reported suicidal ideation in a sample of 250 clients who participated in a group-based chronic pain management programme involving physiotherapists.

Although Taylor et al. (2007) drew on data from a representative sample of the general South Australian public (n = 5,037), only a small number of participants (n = 249; 4.9%) had consulted a physiotherapist in the four weeks before completing the survey. Consequently, the prevalence of physiotherapy clients experiencing STBs (5.4%) was based on the people who had attended physiotherapy (n = 249). The number of participants attending the neuro-otology clinic in the study conducted by Herdman et al. was much larger than in Taylor et al. (954 and 249, respectively). However, the findings of Herdman et al. have limited generalisability, as only one clinic in a single hospital was studied. Kowal et al. (2014) examined clients with chronic pain; therefore, their findings may not be representative of clients of a generalist physiotherapy practice. Despite the limitations, based on these studies, it can be estimated that the point/month prevalence of STBs among physiotherapy clients is approximately 5% and that STB prevalence may be higher among certain client groups (e.g., those with chronic pain).

Several articles revealed valuable qualitative contextual information about the contact between physiotherapists and clients with STBs, such as the role of physiotherapy in case management and whether the physiotherapist engaged in discussions with the client about their STBs. McGrath et al. (2020) interviewed nine Australian physiotherapists working in private practice, who all reported contact with clients with STBs, including clients at immediate risk of suicide. Three studies described clients who had STBs and participated in physiotherapy treatment programmes. Gyllensten et al. (2003) interviewed clients who had undergone basic body awareness therapy, which was said to "restore balance, freedom and unity of body and mind … [through] movements, breathing, massage and awareness" (Gyllensten et al., 2003, p. 173) in clients with mental illness. One client in the programme was transferred from the rehabilitation ward as a result of intense STBs (Gyllensten et al., 2003). Norwegian psychomotor physiotherapy (NPMP) is a physiotherapy approach targeting physical, psychological and social factors affecting the body through "muscle tension, breathing, posture, balance, movements and flexibility" (Dragesund & Kvåle, 2016, p. 1). Of the 10 clients who underwent NPMP and were interviewed by Ekerholt (2011), two reported STBs (20%). In contrast, Dragesund and Øien (2019) interviewed eight physiotherapists providing NPMP, one of which reported encountering a client they suspected may have been at risk of suicide.

Eleven case studies described physiotherapy contact with clients who had physical health conditions and had either made a suicide attempt (Brockington, 2017; Edmunds & Gafner, 2003; Hickey et al., 2017; Lo Pardo et al., 2016; Marusic et al., 2014; Shetye et al., 2014), gone on to complete suicide (Sola & dos Santos, 2017), or had suicidal ideation (Berg, 2011; Cheeks et al., 2014; Miller et al., 2017; Omura & Osorio, 2018). Two of the case studies went beyond a brief mention of the involvement of a physiotherapist with a client with STBs. Brockington (2017) shared the story of a mother who completed filicide and attempted suicide after a letter from the "physiotherapist about a minor hip problem was interpreted [by the mother] as removing [the child] because of maltreatment" (Brockington, 2017, p. 67). Edmunds and Gafner (2003) reported that combining physiotherapy and psychological treatment improved the mood and well-being of a client with a history of physical and mental health issues, including a previous suicide attempt.

The literature in this area has also considered specific population groups, such as athletes and police. An editorial by Malcolm and Scott (2012) discussed the role of sports clinicians in the assessment and management of clients with STBs using the completed suicide of a German football player who hid his diagnosis of depression as an example. The footballer was reported to be very close with the club physiotherapist. Malcolm and Scott raised the question of how the footballer's fate may have been altered if the medical team had managed his condition differently. Berg et al. (2006) examined the help-seeking behaviours of Norwegian police officers. They found that 20.9% of police officers with suicidal ideation had contact with a physiotherapist in the preceding 12 months, suggesting that physiotherapists who work with police may encounter clients with STBs.

Four magazine/newspaper articles were identified that mentioned contact between physiotherapists and clients with STBs. Lascelles (2014), a suicide prevention lead nurse at Oxford Health NHS Foundation Trust, argued that physiotherapists need to be aware of their clients' risk of suicide. Lascelles referred to an unpublished survey conducted in 2013 aimed at mental health practitioners working in England. A small number of musculoskeletal physiotherapists (n = 5) responded to this unpublished survey, stating that they frequently encountered patients experiencing suicidal thoughts (K. Lascelles, personal correspondence, February 22, 2018). Based on these findings, Lascelles conducted SRA training for physiotherapists in the Oxford Health NHS Foundation Trust (Lascelles, 2014). One physiotherapist who participated in this training told Lascelles that she had a "high-risk individual on her caseload" and another stated "we [physiotherapists] all get clients who disclose suicidal thoughts or would be considered at risk of suicide" (Lascelles, 2014, p. 25).

Doesburg (2016), a professional advisor for Physiotherapy New Zealand, wrote an article to help guide physiotherapists in response to being contacted for guidance by "a few" (Doesburg, 2016, p. 8) private practice physiotherapists who had encountered clients with STBs. Doesburg provided a basic overview of SRA and mental health crisis management principles, such as the need to ask the client directly about their

STBs, letting the client talk openly about their suicidal thoughts rather than changing the topic, and the need to refer these clients to mental health practitioners.

A member of the Agence France-Presse (2007) interviewed a physiotherapist working in a burns unit in Iraq, who reported that patients would often confide in her. The physiotherapist spoke about the issues of women completing and attempting suicide by self-burning; family conflicts and perceived issues associated with a male-dominated Iraqi society were reported to contribute to the phenomenon. The magazine article by Tepper et al. (2019) differed to previously mentioned newspaper/magazine articles as it explored the perspective of a physiotherapy client. The physiotherapy client told his story of how two spinal fractures, multiple spinal surgeries, and an opioid addiction resulted in him attempting to take his own life (Tepper et al., 2019). The person felt that the physiotherapist was instrumental in his recovery, stating: "She wasn't just my PT, but my psychologist, my sounding board, my marriage counselor [sic], educator of my options, and my kick in the ass" (Tepper et al., 2019, p. 38).

Physiotherapists' experiences of clients with STBs

Six articles explicitly discussed a range of situations in which physiotherapists could encounter clients with STBs. A common finding was that physiotherapists self-reported a lack of skills to perform an effective SRA, due to a lack of training, guidance, and confidence.

McGrath et al. (2020) found that physiotherapists reported being relatively confident managing clients at high risk of suicide but lacked confidence in their ability to assess clients with less overt STBs. The authors referred to this finding as difficulty navigating the middle space, as it reflected the physiotherapists' lack of confidence managing clients in the middle portion of the suicide spectrum. The physiotherapists interviewed by McGrath et al. reported receiving little to no training on SRA. One physiotherapist in the study by Nielsen et al. (2014) similarly reported that most physiotherapists tended not to refer clients to mental health practitioners unless the client was "really sort of suicidal or in a really bad way" (Nielsen et al., 2014, p. 203). McVey et al. (2016) conducted two multi-professional structured discussion forums hosted on Twitter in 2014 and 2015 for a range of health practitioners, non-health professionals, and the general public to discuss suicide, and noted that some of the participating physiotherapists lacked the confidence to perform an SRA.

Again, a small number of participants, including at least one physiotherapist in the study by Cottrell et al. (2017), reported concern about their ability to manage clients with STBs. Cottrell et al. explored the perceptions of clinicians using the telehealth service delivery model, which might bring additional challenges to SRA that are not present in face-to-face consultations. Lascelles (2014) and Doesburg (2016) reported that physiotherapists had requested further training, advice, and direction on how to respond to clients with STBs. The findings presented in these articles demonstrate that physiotherapists were actively seeking support and guidance in their ability to manage clients experiencing STBs. One physiotherapist, who participated in the suicide awareness session delivered by Lascelles (2014), reported increased understanding of the "less obvious risk issues" (p. 25), while another reported feeling more comfortable after the training knowing how to manage clients who disclose STBs.

The findings of the six articles that focused on physiotherapists' experiences suggested reduced confidence in SRA skills due to a lack of specific training and that physiotherapists may only recognise the need for a referral to a mental health practitioner when a client is at high risk of suicide.

DISCUSSION

This narrative review revealed that despite the prevalence of STBs and evidence that poor physical health is a risk factor, there is a lack of international research that *specifically* investigated encounters between physiotherapists and clients with STBs. The level of evidence provided by the articles was generally low, but this was due to a lack of studies designed to empirically explore the phenomenon of interest. However, important anecdotal evidence was garnered, for example from case studies and magazine and newspaper articles, of the contact between physiotherapists and clients with STBs. Whilst the findings of these articles could not be systematically assessed, they provide lived experience narratives from physiotherapists and their clients experiencing STBs. In the context of the broader literature, which is relatively scarce, the findings also provide valuable insight that can inform a deeper understanding of potential issues and future research directions.

Based on the limited number of studies (Herdman et al., 2020; Taylor et al., 2007) which examined the point/month prevalence of STBs among physiotherapy clients, a tentative estimate of 5.4% can be made, which although not directly comparable, is higher than the 12-month prevalence of suicidal ideation in Australia, which is 2.4% among the general population (Australian Government Department of Health, 2009). Potter et al. (2003) found that 62% of physiotherapists see 41-80 clients per week. Using the figures from three studies (Herdman et al., 2020; Potter et al., 2003; Taylor et al., 2007), it could be estimated that physiotherapists may encounter between two and five clients with STBs per week.

Physiotherapy clients with STBs included (a) people with physical conditions, (b) people with mental health issues, and (c) members of certain groups (such as police officers). Physiotherapists also came into contact with clients with STBs in several different settings, including general physiotherapy practice, hospital settings (e.g., psychiatric wards, orthopaedic outpatients, medical wards), sports settings, and specialist clinics (e.g., neuro-otology clinics).

Physiotherapists came into contact with people at various stages of the suicide trajectory. They encountered clients experiencing active suicidal ideation (e.g., McGrath et al., 2020), clients who went on to complete suicide (e.g., Sola & dos Santos, 2017), and clients who previously attempted suicide (e.g., Tepper et al., 2019). Some physiotherapists were directly involved in the treatment of physical conditions that were a sequela of incomplete suicide (e.g., Lo Pardo et al., 2016), while other physiotherapists managed physical health conditions that were not associated with a suicide attempt (e.g., Hickey et al., 2017).

Physiotherapists experience discomfort working with clients with STBs and lack confidence in performing an SRA (Cottrell et al., 2017; Doesburg, 2016; Lascelles, 2014; McGrath et al., 2020; McVey et al., 2016; Nielsen et al., 2014). Potter et al. (2003) found that clients who are unhappy in life, helpless/hopeless, catastrophisers, highly anxious, and negative thinkers, as well as clients who have low self-esteem/self-confidence or make significant self-disclosures, are generally considered "difficult patients" by physiotherapists. Based on the characteristics of "difficult patients", described by Australian physiotherapists in Potter et al., it is likely that clients with STBs may also be perceived as "difficult patients". Although the term "difficult patient" implies that the client is to blame, the term is more likely describing client encounters that are difficult for health practitioners to manage (Potter et al., 2003). Physiotherapists appeared to have the greatest difficulty assessing and managing clients at low to medium suicide risk, due to trouble identifying less overt STBs (McGrath et al., 2020). The authors hypothesise that physiotherapists may feel more confident managing clients at a high risk of suicide, as the need for a referral to a mental health clinician is more apparent. However, further research is needed to test this hypothesis.

Limitations

As the *Framework for Suicide Risk Assessment and Management for NSW Health Staff* (NSW Health, 2004) was the stimulus for the review, the research took an Australian orientation. International literature was included in the review after it became apparent during a preliminary literature search that there was a paucity of Australian literature. Australian literature formed a small component of this review (n = 4) and was not specific to NSW Health staff. Consequently, the relevance of the findings to the *Framework for Suicide Risk Assessment and Management for NSW Health Staff* (NSW Health, 2004) may be limited. Despite this, the findings of the review provide insight into the practices and preparedness of the international physiotherapy profession to manage clients with STBs. Another limitation of this review was that physiotherapists from multiple countries were discussed as one homogenous profession; this does not allow for a nuanced discussion of the differences in professional requirements and scope of practice that exist between countries. Limitations regarding the method include (a) the inclusion of articles that were anecdotal and not peer-reviewed, (b) the influence of Google Scholar's non-transparent ranking algorithm on the identification of articles, and (c) the possibility of missing relevant articles as a consequence of limiting the review to the first 25 results of each Google Scholar search.

Recommendations

It is good practice for all physiotherapists to be able to identify and address STBs in clients. Future research into the inclusion of SRA content in entry-level physiotherapy courses is needed. Furthermore, physiotherapists working with populations at an elevated risk of suicide should receive post-graduate training to increase their confidence and competence for undertaking an SRA. It has been suggested that physiotherapists are well-positioned to become leaders in the management of physical health of people with poor mental health (Andrew et al., 2019). However, without basic competency in SRA, the well-being of clients and physiotherapists may be at risk.

Physiotherapists may consider seeking resources and further training in assessing and managing STBs from programmes such as Mental Health First Aid (MHFA). Edgar and Connaughton (2021) found that after MHFA training, physiotherapy students reported learning "that it is OK to ask directly if a person has thoughts of suiciding" (Edgar & Connaughton, 2021, p. 191), which is consistent with evidence-based approaches to suicide management (Polihronis et al., 2020). However, El-Den et al. (2018) found that while pharmacy students who had completed MHFA training reported increased confidence in managing clients with STBs, simulated vignettes revealed that students often avoided using suicide specific terminology, with only half of students assessed as having passed the suicide vignette. Thus, although MHFA may improve knowledge and confidence, it may not be adequate alone to result in practice outcomes. It also should be noted that while health practitioners may complete MHFA, the programme is also aimed at the general public (DeFehr, 2016). Consequently, these programmes are not designed to be contextual to physiotherapy practice. The *Framework for Suicide Risk Assessment and Management for NSW Health Staff* (NSW Health, 2004) contains a general guide aimed at health practitioners on how to assess and manage a client with STBs and lists some of the important risk factors for suicide. However, it is also not contextual to physiotherapy practice.

Although guides may support physiotherapists to complete an SRA, perhaps suicide prevention should be embedded within physiotherapy practice and draw on existing strengths. For example, trust appears to be a prominent feature in physiotherapy practice and is said to be essential in the disclosure of STBs (Ganzini et al., 2013; Hiller, 2017). McGrath et al. (2020) found that physiotherapists appear to be "uncovering [STBs] through small talk, conversational-style interviewing, and a trusting practitioner-client relationship" (McGrath et al., 2020, p. 16). McGrath et al. also found that physiotherapists appear to be particularly interested in exploring how their clients are coping with their injury and daily life. One approach which may build on the existing strengths of physiotherapy is a coping planning approach to suicide prevention (Stallman, 2018). Coping planning is a suicide prevention strategy which shifts the focus from what the clinician does (completing an SRA) to what the client needs (healthy coping strategies; Stallman, 2018). Based on the findings of McGrath et al. (2020) and Hiller (2017), a coping planning approach appears well suited to the framework of physiotherapy practice and would likely build on existing strengths.

CONCLUSION

Although NSW Health (2004) identified physiotherapists as practitioners that need to be able to conduct a preliminary SRA, there is very little research that has investigated either the contact or experiences of physiotherapists with clients with STBs. Based on the articles identified in this study, it is evident that physiotherapists encounter clients with STBs in a range of clinical settings, and that physiotherapists believe

they lack confidence and training to assess clients with STBs. This review highlights that physiotherapists may have the opportunity to contribute to suicide prevention due to their contact with clients at risk of suicide. If governments want to make suicide prevention everyone's business, they must ensure health practitioners working in all sectors, including private practice, are prepared and supported to manage clients with STBs. Future research is required to explore encounters between physiotherapists and clients with STBs in terms of the prevalence of STBs among physiotherapy clients, and whether physiotherapists are equipped to complete and action the outcomes of an SRA.

KEY POINTS

1. Physiotherapists may encounter clients with suicidal thoughts and behaviours due to the relationship between suicide and poor physical health and/or chronic pain.
2. There is substantial evidence of contact between physiotherapists and clients with STBs, but there is a paucity of research exploring the prevalence or frequency of this contact.
3. There is some evidence to suggest that physiotherapists lack confidence in performing an SRA.
4. Future research is needed to investigate encounters between physiotherapists and clients with STBs in the Australian context and the preparedness of physiotherapists to effectively manage these clients.

DISCLOSURES

No funding was obtained for this study. There are no conflicts of interest which may be perceived to interfere with or bias this study.

PERMISSIONS

No permissions were required.

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Flatfoot and Balance Performance Among Junior Secondary School Students in Ibadan, Nigeria

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ABSTRACT

Adequate body balance is important in preventing falls and injuries in children during physically active play and sports at school. The structure of the foot is essential to the ability to balance, but findings from studies comparing balance of children with and without flatfoot have been equivocal. We investigated the prevalence of flatfoot among school children in Ibadan, Nigeria, and compared selected balance indices in participants with and without flatfoot. Participants in this cross-sectional study were 300 junior secondary school students (aged 10–14 years). The navicular drop test, single limb stance test and tandem walk test were used to assess the presence of flatfoot, and static balance and dynamic balance, respectively. Data were summarised using percentages, mean and SD and, analysed with independent t-tests and chi-squared tests. The prevalence of flatfoot was 39.7%, and while higher in boys (44.7%) than girls (34.9%), this was not significantly different. Participants with flatfoot had significantly poorer mean static balance measures than those who did not (right: 25.70 [SD 6.55] vs 27.89 [SD 4.92]; left: 26.21 [SD 6.01] vs 28.52 [SD 4.27]), but there was no significant difference in dynamic balance between the groups. When treating children with flatfoot, physiotherapists may consider measuring static balance and, where appropriate, incorporate balance activities as part of the overall management plan.

Adegoke, B. O., Alumona, C. J., Adeyemo, A. A., & Adeyinka, A. O. (2021). Flatfoot and balance performance among junior secondary school students in Ibadan, Nigeria. *New Zealand Journal of Physiotherapy, 49(2),* 82–88. https://doi.org/10.15619/NZJP/49.2.04

Key Words: Adolescence, Balance, Children, Flatfoot, Prevalence

INTRODUCTION

Balance is a complex motor control task that involves the integration of sensory information about body postures and the execution of appropriate responses of the musculoskeletal system for postural control within the context of the environment and tasks (Karakaya et al., 2015). It is the ability to maintain the body's centre of gravity within the base of support (Yiou, et al., 2017), and its maintenance requires the integration of feedback and movement strategies among the hip, knee, and ankle joints (Panjan & Sarabon, 2010). The structures of the foot play an important role in standing and walking as they transfer the body's weight to the ground and maintain balance (Hyong and Kang, 2016).

The arches of the foot, namely the medial and lateral longitudinal arches, and the transverse arches, act as shock absorbers and maintain stability during standing and walking (Takata et al., 2013). These arches are maintained by bones, ligaments, joint capsules, and the plantar fascia, and are supported by intrinsic and extrinsic foot muscles; these tissues also provide sensory input (McKeon et al., 2015; Henry et al., 2019). Flatfoot, or pes planus, is a condition characterised by the loss of the medial longitudinal arch of the foot (Lee et al., 2015).

Flatfoot in children is mostly physiological (Lee et al., 2015), as it normally manifests at birth but diminishes in childhood as the arches of the foot develop in the first decade of life (Mosca, 2010). Arch development commences from the age of 3 to 5 years (Lee et al., 2015), progresses between 6 and 7 years (Chang et al., 2014) and is complete before the age of 10 years (Lee et al., 2015; Müller et al., 2012; Tong & Kong, 2016). However, some children may not have developed arches of the foot, even at maturity (Chang et al., 2014).

Flatfoot is usually accompanied by increased eversion and pronation of the hindfoot (Alam et al., 2019), and increased abduction and supination of the forefoot (Lee & Kim, 2014). These presentations put the hindfoot and forefoot rotationally in opposite directions, which according to Mosca (2010), gives the impression that the foot has been "wrung out like a towel". These structural deformations lead to decreases in the ability to absorb shock (Kim & Kim, 2016) and gait efficiency (Lee & Kim, 2014), and an increase in energy consumption during walking (Tahmasebi et al., 2015).

Most children with flatfoot rarely experience pain and disability, hence most referrals for clinical evaluation are because of parental concerns (Mosca, 2010). However, some children occasionally present with pain, especially after intense exercise and long walks (Fabry, 2010). Pain may be localised in the foot or be more diffuse (Yeagerman et al., 2011). Another clinical consideration is whether the flatfoot is flexible or rigid. When the flatfoot is flexible, the medial longitudinal arch collapses during weight bearing but reappears in toe standing. In contrast, the arch remains collapsed both during weight- and non-weight bearing in cases of rigid flatfoot (Nemeth, 2011). Jack's test, whereby the great toe is dorsiflexed, thus tightening the plantar fascia, can also be used to distinguish between flexible and rigid flatfoot (Atik & Ozyurek, 2014). The flatfoot is considered flexible when an arch is formed during the test, and rigid when no arch is formed. Conservative management approaches to flatfoot include walking barefoot, advice and education, footwear selection and modifications, foot orthoses (shoe inserts), and exercise, including stretching and strengthening (Rome et al., 2010).

Children of school age engage in lots of physically active play and sports which require adequate body balance in order to prevent falls and injuries. However, it is not clear if there is a difference in the ability of children with and without flatfoot to balance, given that reports from previous studies have been equivocal. It is believed that flatfoot decreases the proprioceptive and kinesthetic awareness of the foot due to excessive stress that is applied to joint proprioceptors. Thus, Tahmasebi et al. (2015) found that individuals with flatfoot had poorer balance than those without flatfoot when measured with a force plate. Conversely, it is claimed that excessive flattening increases the contact area of the foot, which invariably increases postural balance (Lin et al., 2006). Lin et al. (2006) suggested that individuals with flatfoot have better balance when measured with a force plate because of increased somatosensory feedback to the central nervous system achieved from increased contact area. Given that the arches are fully developed before age 10 (Lee et al., 2015; Müller et al., 2012; Tong & Kong, 2016), it is important to document the prevalence of flatfoot among children aged 10 years and above. Also, since there is no clear evidence that flatfoot will lead to a painful condition in adulthood (Kwon & Myerson, 2010), understanding the prevalence in a paediatric population will be useful in reassuring parents that flatfoot could be typical in a large proportion of the population without detriment (Mosca, 2010). Further, data on the prevalence of flatfoot among Nigerian children older than age 10, when the arches are believed to be fully developed, are not available in literature. This study was, therefore, designed to investigate the prevalence of flatfoot among 10- to 14-year-old secondary school students in Ibadan, Nigeria, and to compare the balance performances of those with and without flatfoot.

METHODS

Participants

This cross-sectional study involved 300 junior secondary school students (aged 10–14 years). Of the 36 approved public junior secondary schools in the Ibadan North local government area of Oyo State, Nigeria, 10 were selected for the study through systematic sampling. Of the 300 participants, 30 were purposively recruited for the study from each of the selected schools. All pupils met the inclusion criteria of being (a) 10–14 years of age; (b) healthy, with no obvious lower limb deformity, neurological or vestibular dysfunction, or history of fracture to the foot or knee that could impair proprioception and hence balance; and (c) in public junior secondary schools. A non-proportional sampling technique was used to select equal numbers of male and female participants for the study. The minimal sample size of 267 was calculated using the formula of Charan and Biswas (2013):

$$N = \frac{Z_{(1-\alpha/2)}^{2}\, p(1-p)}{d^2}$$

Where, N = sample size

$Z_{(1-\alpha/2)}$ = 1.96 (Z-value at 95% confidence interval)

p = estimated prevalence of pes planus among Nigerian school children being 22.4% according to Ezema et al. (2014)

d = 0.05 (absolute error or precision)

Also, a power analysis was performed *a priori* using G*Power 3.1.9.7 software, based on balance data between normal and flatfoot individuals from a study by Tahmasebi et al. (2015). A total of 102 per group was shown to be necessary, based on an effect size of 0.35, an alpha level of 0.05, and a power of 0.8. The minimum calculated sample size was 204, but 300 participants were recruited for the study. Thus, the study was sufficiently powered.

The study was conducted in accordance with the Declaration of Helsinki and was approved by the University of Ibadan/University College Hospital Research Ethics Committee (approval number UI/EC/14/0276). Consent was provided by both the participants' parents and the participants themselves before they took part in the study.

Procedure

Participants' body weight (kg) and height (m) were measured using a weighing scale and height metre, respectively, and their BMI (kg/m^2) was estimated using the standard formula.

Assessment for flatfoot

The navicular drop test, as described by Brody (1982) and Hyong and Kang (2016), was used to determine the presence of flatfoot among the participants. This test has been reported to have concurrent validity and reliability (both inter- and intra-rater) of 0.6 and 0.9, respectively, for the assessment of flatfoot (Zuil-Escobar et al., 2018). The participants were instructed to sit comfortably on a chair with arm rests, with their hips and knees flexed at 90°, their ankle joints placed in a neutral position, and their feet touching and resting on the floor. The most protruding part of the navicular tubercle of each foot was identified and marked. The distance between the mark and the ground was then measured with a 1mm resolution plastic ruler. The measurement was repeated with the participant in the standing position. Each measurement was taken three times and the mean calculated. The difference between the mean values obtained in sitting and standing was recorded in mm for both feet. Values from 6 mm to 9 mm were considered normal,

while values equal to or greater than 10 mm were considered indicative of flatfoot (Hyong & Kang, 2016).

Static balance assessment

Participants' static balance was assessed using the single limb stance test. The inter-rater reliability of this test has been reported as 0.9 (Choi et al., 2014; Springer et al., 2007), with a concurrent validity of 0.6 (De Kegel et al., 2010). The test was performed barefooted. Prior to commencing testing, participants were familiarised with the test and allowed to practise the procedure for 5 min in order to decrease the chance of a learning effect during testing. They were instructed to lift the non-test limb off the ground, flex the hip and knee joints to 90º while weight-bearing on the test limb, with their arms folded across their chest and both eyes open. Timing began from the point of lifting the leg off the floor and ended when any of the following occurred: (a) displacement of the stance limb, (b) the elevated limb contacting the floor or (c) participants terminating the test. Three trials were performed with the mean used for data analysis as suggested by Springer et al. (2007). A rest period of 30 s was observed between trials. The time (s) was recorded as a measure of participants' static balance before termination of the test. The test was conducted for both feet.

Dynamic balance assessment

Dynamic balance was assessed using the tandem walk test as described by and Fregly et al. (1972), and Robertson and Gregory (2017). The tandem walk test has a concurrent validity and reliability (both inter- and intra-rater) of 0.7 and 0.9, respectively (Koyama et al., 2018). As for static balance assessment, participants were first familiarised with the test and given practice sessions. They were then asked to walk 10 steps barefooted, heel-to-toe without spaces between the steps as fast as possible; these steps were taken along a straight line drawn on the floor. The test was first performed with their eyes open followed by a rest period of 30 s, and then with their eyes closed. The number of correct consecutive steps taken before an error occurred was counted and documented as a measure of participants' dynamic balance. The following constituted errors and, hence, reasons for termination of the test: (a) stepping out of the drawn line, (b) leaving a space between their feet, and (c) opening their eyes during the eyes-closed test. The data for the eyes-closed and eyes-open test conditions were analysed separately.

Data analysis

A post-hoc power analysis performed using G*Power 3.1.9.7 software on the balance performance of individuals with and without flatfoot revealed that the study was adequately powered (0.88) at alpha of 0.05, with an effect size of 3.7, and a sample size of 119 for flatfoot individuals and 181 for those without flatfoot. Data were analysed using SPSS (version 15). The data were summarised using mean, SD, and percentages. An independent t-test was used to compare height, weight, age, BMI between sexes, and indices of balance performance between those with and without flatfoot. A chi-squared test was used to compare the prevalence of flatfoot in males and females. Inferential statistics were carried out at 0.05 alpha level.

RESULTS

Participants' demographic data are presented in Table 1. Independent t-tests indicated that the female participants weighed significantly more ($p < 0.001$) and were significantly taller ($p < 0.001$) than their male counterparts, while participants without flatfoot were significantly taller ($p = 0.02$) than those with flatfoot (Table 1). The prevalence of flatfoot among all participants was 39.7%. There was no statistically significant difference between the prevalence of flatfoot in the male (44.7%) and female (34.7%) participants (Table 2). The prevalence rates of flatfoot on the right foot, left foot, and both feet were 37.8%, 28.6%, and 33.6%, respectively (Table 3). Static balance performance was significantly poorer ($p < 0.001$) among participants with flatfoot, but dynamic balance between the groups was not significantly different (Table 4).

DISCUSSION

The prevalence of flatfoot observed in this study was lower than the rates reported in previous studies. Pfeiffer et al. (2006) reported that the prevalence of flatfoot among 3- to 6-year-old students was 44%, while Chang et al. (2010) reported 59% among 7- to 12-year-old children. The higher prevalence reported in the above studies may be attributed to the younger age of the participants. Ezema et al. (2014) and Pourghasem et al. (2016) reported that a decrease in the prevalence of flatfoot is associated with increase in age. It is also plausible that there is an ethnic variation in foot development and morphology that may in turn result in variation in the incidence of flatfoot. Thus, in a study among Spanish children aged 4–13 years, a considerably lower prevalence of 2.7% was reported (García-

Table 1

Comparison of Participants' Demographic Characteristics

Variable	Gender					Presence of pes planus					All	
	Male		Female			Yes		No				
	M	*SD*	*M*	*SD*	*p*	*M*	*SD*	*M*	*SD*	*p*	*M*	*SD*
Age (years)	13.02	1.03	12.93	1.04	0.44	12.88	1.10	13.03	0.99	0.22	12.97	1.03
Height (m)	1.47	0.08	1.51	0.08	<0.001*	1.47	0.08	1.50	0.08	0.02*	1.49	0.08
Weight (kg)	35.15	6.36	38.44	6.95	<0.001*	36.08	6.71	37.26	6.92	0.14	36.79	6.85
BMI (kg/m^2)	16.15	1.56	16.85	2.11	<0.001*	16.48	1.88	16.51	1.89	0.85	16.50	1.89

*Statistically significant.

Table 2

Chi-Square Test Comparison of Flatfoot Prevalence in Male and Female Participants

Prevalence	Male *n* = 150		Female *n* = 150			Total *N* = 300	
	n	%	*n*	%	*p*	*N*	%
Flatfoot	67	44.7	52	34.7	0.10	119	39.7
None	83	55.3	98	65.3		181	60.3

Table 3

Flatfoot Prevalence in Male and Female Participants by Foot

Foot affected	Male *n* = 67		Female *n* = 52		Total *N* = 119	
	n	%	*n*	%	*n*	%
Right	24	35.8	21	40.4	45	37.8
Left	21	31.4	13	25.0	34	28.6
Both	22	32.8	18	34.6	40	33.6

Table 4

Comparison of Balance Performance of Participants With and Without Flatfoot Using an Unpaired T-Test

Variable	Presence of pes planus				
	Yes		No		
	M	*SD*	*M*	*SD*	*p*
Single limb stance (s)					
Right	25.70	6.65	27.89	4.92	<0.001*
Left	26.61	6.01	28.52	4.27	<0.001*
Eyes open tandem walk test (number of steps)	6.38	3.53	6.16	3.53	0.61
Eyes closed tandem walk test (number of steps)	1.99	2.13	1.97	1.50	0.92

*Statistically significant.

Rodríguez et al., 1999), while 26.6% was reported among Chinese children aged 6–13 years (Yin et al., 2018).

There is a wide variation in the reported prevalence of flatfoot among children in Nigeria. However, the rates observed from earlier studies, though steadily increasing (Abolarin et al., 2011; Didia et al., 1987; Ezema et al., 2014), have been lower than what was observed in this study. The potential reasons for the variation in the reported rates are differences in methodology and social/environmental factors, such as time spent barefooted. Specifically, parents today are less likely to allow their children to either move around or engage in outdoor games barefooted. This is despite the suggestion that going barefooted is the easiest way to prevent or correct flatfoot in children (McKeon et al., 2015). It is worth noting that three studies (Abolarin et al., 2011; Didia et al.,1987; Ezema et al., 2014) utilised the footprint method as opposed to the navicular drop method used in this study. Interestingly, it has been reported that the footprint method does not always reflect the true medial longitudinal arch of the foot due to its static nature and may, hence, give inaccurate results (Yalçin et al., 2010).

There was no gender difference in flatfoot prevalence, in agreement with findings from a previous similar study (Abolarin et al., 2011). While differences in growth and development in males and females, such as greater hindfoot valgus in males versus a greater hindfoot development in females have been noted (Ezema et al., 2014) these observations appeared to make no difference to the participants in this study.

Participants with flatfoot had significantly poorer static balance than those without, consistent with findings from previous studies (Kim et al., 2015; Tahmasebi et al., 2015).

To maintain balance, various inputs, such as visual, vestibular, and proprioceptive, are required. Joint, skin and muscles are the main sources of proprioception (Han et al., 2016), and the characteristics of the foot shape can affect the tension of these tissues (Takata et al., 2013). Therefore, any change in foot shape and alignment can affect balance by decreasing the proprioceptive inputs required for balance maintenance. Further, poorer static balance has been attributed to instability of the subtalar joint, as suggested by high values of navicular drop (Kim et al., 2015). The subtalar joint directly controls the stability of the hindfoot and the forefoot (Krähenbühl et al., 2017); hence excessive flexibility of the subtalar joint during weight bearing increases pronation, which might lead to an unstable support base and subsequent decreased instability of the foot (Kim et al., 2015). The single limb stance test is relevant to the children's activities on the playground and at home, in that the position is adopted during activities such as kicking a ball, hopping, skipping, stepping over obstacles, and getting dressed.

There was no significant difference between the dynamic balance of participants with and without flatfoot in this study. This is consistent with findings from previous studies (Hyong & Kang, 2016; Kim et al., 2015). The lack of difference between the dynamic balance of those with and without flatfoot may be due to reported increased contact points between the foot and the ground, with consequent increased stimulation of the plantar cutaneous receptors (Lin et al., 2006). It can also be attributable to the compensatory postural adjustments during the balance test (Hyong & Kang, 2016). One of the adjustments may be muscular compensation with the tibialis anterior and posterior, and fibularis longus and brevis muscles (Kim et al., 2015; Mulligan & Cook 2013). In addition to muscular compensation, other factors may include integration of auditory, somatosensory and biomechanical factors (Kim et al., 2015). The tandem walk test is relevant to children's typical daily activities, such as the balance beam exercise and measuring the width of an improvised goal post during football games.

This study has some limitations. First, it did not gather data on some potentially relevant factors, such as a description of footwear, barefoot versus footwear use, leg dominance, foot-toe muscle strength, habituation, exercise/physical activity level, joint laxity, parental income, or dietary intake. Also, the participants in each group might have exhibited varying degrees of effort during the test procedures, which could have masked or exaggerated the difference between the groups. Therefore, the findings should be interpreted with caution. Future studies should consider the age-by-age prevalence of flatfoot and determine the age at which flatfoot in children will no longer resolve with growth.

Clinical relevance

Although flatfoot rarely leads to disability in adulthood, it is still a major concern to parents (Kwon et al., 2010). However, the prevalence of flatfoot in this study could be reassuring for parents, as it suggests that asymptomatic flatfoot can be common in a large proportion of the population.

Also, the information on high prevalence of flatfoot among children aged 10–14 years can be useful to physiotherapists, as interventions capable of resolving the condition may be instituted early in childhood in order to reduce its impact. Furthermore, physiotherapists may want to measure balance and, where appropriate, incorporate balance activities as part of the overall management plan.

The navicular drop, single limb stance and tandem walk tests used for the assessment of flatfoot, static balance, and dynamic balance, respectively, are easy to perform and can be done in any setting without the use of high-tech equipment. This information can be useful for clinicians working in any environment.

CONCLUSION

The prevalence of flatfoot among junior secondary school students in Ibadan, Nigeria, was 39.7%. The students with flatfoot had significantly poorer static balance than those without flatfoot, but the dynamic balance of the groups was not significantly different. Spending quality time barefooted is the easiest way to prevent or correct flatfoot in children, but reassuring parents, appropriate shoe selection, shoe inserts, and exercises are alternative conservative management approaches.

KEY POINTS

1. The prevalence of flatfoot in 10- to 14-year-old Ibadan students was 39.7%.
2. Static balance was poorer in participants with flatfoot than those without.
3. Dynamic balance was similar between groups.
4. Flatfoot is often benign but can be managed conservatively through spending more time barefooted, advice/education, shoe selection, shoe inserts, and exercises.

DISCLOSURES

No external funding was received for this study. There are no conflicts of interest which may be perceived to interfere with or bias this study.

PERMISSIONS

The study was conducted in accordance with the Declaration of Helsinki and its protocol approved by the University of Ibadan/University College Hospital Research Ethics Committee (approval number UI/EC/14/0276). Consent was provided by both the participants' parents and the participants themselves before they were recruited for the study.

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The Perceived Role of the Strength and Conditioning Coach in Athlete Rehabilitation

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ABSTRACT

Strength and conditioning (S&C) coaches may collaborate with physiotherapists in athlete rehabilitation, but their role has not been documented. Therefore, this study aimed to clarify their role through the perspectives of physiotherapists and S&C coaches. The researchers conducted semi-structured interviews in New Zealand with four physiotherapists and five S&C coaches, including one who had previously been a physiotherapist. Thematic analysis identified 13 themes analysed in four categories: current role (teamwork with the rehabilitation team, level of involvement, and physical roles), proposed role (teamwork with the rehabilitation team, level of involvement, and physical roles), variables (rehabilitation team structure, governance, relationships in the rehabilitation team, and the athlete), and significance (positive and negative). Currently, most S&C coaches have a small role in providing performance training at the end of rehabilitation. Participants thought they should be involved earlier, but poor communication and collaboration with health professionals reduce their role. They proposed that S&C coaches should be somewhat involved following a health professional's diagnosis, increasing their involvement as athlete function improves and the physiotherapist's role decreases. Participants agreed that this role should be flexible and account for each clinical context.

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Key Words: Professional Role, Physical Conditioning, Human, Physiotherapy, Return to Sport, Sports Medicine

INTRODUCTION

Despite their roles in injury prevention and health promotion, strength and conditioning (S&C) coaches are traditionally thought of as performance professionals, not health professionals (Triplett et al., 2017). S&C coaches generally work with healthy athletes to prepare them for the physical demands of their sport. They incorporate specific exercises into their training programmes to minimise the risk of injury (prehabilitation; Meir et al., 2007). If an athlete is injured, health professionals such as physiotherapists will rehabilitate them.

Physiotherapists can help athletes rehabilitate in medical terms (i.e., range of motion, pain, inflammation, neuromuscular control, muscle, and tissue strength; Bulley et al., 2005; Kraemer et al., 2009; Physiotherapy Board of New Zealand, 2018). Still, those without sport-specific or S&C knowledge will struggle to rehabilitate athletes in performance terms (sport-specific strength, power, agility, endurance, and coordination). Therefore, many athletes do not rehabilitate to their preinjury level of function. S&C coaches may help injured athletes return to their previous level of performance and reduce the risk of reinjury (Bedoya et al., 2015; Sommerfield et al., 2020; Wong et al., 2010).

In some elite sport settings, S&C coaches collaborate with physiotherapists in an athlete's rehabilitation to smoothly integrate the athlete back into sport. Still, the role of these S&C coaches is not well documented. If health professionals and athletes are unaware of this role, S&C coaches cannot help rehabilitating athletes. Kraemer et al. (2009) has suggested a framework for this role in the United States. They indicate that S&C coaches be involved in the end stages of rehabilitation and performance training before returning to sport. Others have advised how to integrate S&C principles (e.g., periodisation, maximal strength training, power training, and sport-specific training) into rehabilitation (Lorenz et al., 2010; Maestroni et al., 2020; Reiman & Lorenz, 2011). However, no studies have explored whether S&C coaches perform these roles in practice.

Defining S&C coaches' roles in athlete rehabilitation may improve their involvement in rehabilitation teams. Role clarity can enhance trust among health professionals, leading to improved support and value of each other's roles and communication (Sims et al., 2015). Therefore, the aim of this study was to explore the perspectives of physiotherapists and S&C coaches in New Zealand on the role of S&C coaches in athlete rehabilitation.

METHODS

This qualitative study used individual semi-structured interviews (Holloway & Galvin, 2016) to identify S&C coach and physiotherapist perceptions of the role of S&C coaches in athlete rehabilitation. The 32-item Consolidated criteria for Reporting Qualitative research (COREQ) checklist was used to report this study (Tong et al., 2007). Ethical approval was obtained from

the Otago Polytechnic Research Ethics Committee (reference number 840).

The primary author (AA) conducted all interviews with the physiotherapists and S&C coaches and independently transcribed and coded each interview. The other researchers provided quality checking of the writing, methodology, and thematic analysis in this study. The primary author had a professional relationship with two of the physiotherapists and one S&C coach before the commencement of this study. The primary researcher informed participants about his background and current study aims before beginning the interviews with the clinicians.

Study design

A six-step inductive approach outlined by Braun and Clarke (2006) guided the analysis of this study. This approach allowed for flexible yet recursive analysis of the data to develop themes that accurately portray the participants' insights (Braun & Clarke, 2006, 2013).

Participants

Participants were selected from a sampling survey completed by physiotherapists and S&C coaches in New Zealand. The survey was spread using chain referral (snowball) sampling (Mack et al., 2005). This technique aimed to maximise the study population, find participants that may not be easily accessible to researchers, and improve the external validity of the findings.

The sampling survey included participants if they were: a resident or citizen of New Zealand or Australia; registered as a physiotherapist with the Physiotherapy Board of New Zealand and held a current annual practising certificate, or were registered and had an annual practising certificate at the time of athlete interaction; an S&C coach as defined in the National Strength and Conditioning Association Strength and Conditioning Professional Standards and Guidelines (Triplett et al., 2017); of legal age to consent (Medical Council of New Zealand, 2019); and worked with an 'athlete' (who meets adapted criteria proposed by Araújo and Scharhag (2016) to include community sports athletes) within their care as a physiotherapist or S&C coach who had been 'moderately disabled' by an injury based on a score of 2 or higher on 'the Bull five-point scale of disability' (Bull, 1978).

The sampling survey excluded participants if they: were unable to provide informed consent; did not speak fluent English, or their speech was impaired such that interview data could not be obtained, and they were unable to provide an interpreter; could not attend an interview and did not have access to adequate software for online interviewing; or had an acute or chronic condition that would limit the ability to participate in the study.

The data gathered from the sampling survey were not included in the thematic analysis. However, it helped provide talking points for the interviews and demographic information, including age, sex, qualifications, and experience in their field and athlete rehabilitation. This information allowed for subgroup analysis if themes and categories were consistent among participants with similar demographics.

Two physiotherapists who were also S&C coaches, 47 physiotherapists, and 19 S&C coaches completed the survey. Of the 68 people who completed the sampling survey, 37 consented to be interviewed. Purposive sampling was used to recruit interviewees from the pool of volunteers (Battaglia, 2008; Onwuegbuzie & Leech, 2007).

One S&C coach with a background as a physiotherapist, four physiotherapists, and four S&C coaches across New Zealand were interviewed using a web-based video platform (Zoom Video Communications Inc., San Jose, California). Audio and video were recorded for each interview and stored in a secure file. All interviews were between 60 and 95 min and no interview was repeated. Written and verbal informed consent was gained before starting the interviews.

Data collection

The primary author (AA) interviewed all participants using a single set of semi-structured, open-ended questions (Appendix A). These questions developed over several weeks through discussion with all researchers with two pilot interviews completed before the first interview. These interviews helped to identify key questions that should be addressed and refine the interview skills of the primary author. The questions in the interviews aimed to address the research question: "what is the role of S&C coaches in athlete rehabilitation?" by addressing four topics:

- current role
- proposed role
- variables that affect the role
- significance of the role

The interview questions addressed ideas surrounding these secondary research questions, but they were not directly asked in the interviews. The interview questions were adapted during the interview to increase the depth and vitality of the interview data. The final analysis was completed from the interview data alone. Audio recordings from the interviews were transcribed verbatim by the primary author.

Data analysis

The primary author conducted and transcribed the interviews and read all the transcripts multiple times to ensure familiarity with the data. A data-driven approach to coding was taken for the transcripts (Braun & Clarke, 2013). Codes were assigned to text segments to accurately portray what participants communicated in the interview. The primary author categorised the codes into four groups relating to the research topics: current role, proposed role, variables, or significance. Within each of these groups, the codes were recorded in a Microsoft Excel (2016) spreadsheet and categorised into subthemes, then candidate themes.

The candidate themes were reviewed at the level of the codes and data to ensure they accurately reflected the interview content. Cross-checking and discussion between the researchers helped confirm these themes. All participants were sent a summary of the results and asked to comment to ensure the results accurately reflected their perceptions. The data were determined to be saturated when no new subthemes emerged from the ninth interview.

RESULTS

Participants

Two females and seven males participated in this study (Table 1). Four were S&C coaches, four were physiotherapists, and one was an S&C coach with a background in physiotherapy. All had five or more years working with athletes and had experience with injured athletes. Participants worked with athletes in a range of sports and levels of competition. This included physiotherapists and S&C coaches employed as part of a sports team's staff and independent, community-level physiotherapists and S&C coaches.

Themes

Thirteen themes relating to the role of the S&C coach in athlete rehabilitation were identified in four categories (Table 2).

In general, participants perceived that S&C coaches do not have enough teamwork, involvement, or roles in athlete rehabilitation. They expressed that the role of the S&C coach in athlete rehabilitation is not concrete. Multiple variables must be considered to avoid barriers and optimise the S&C coach's role. However, all saw the role of the S&C coach in athlete rehabilitation as significant and positive.

Current role

Three main themes relating to the current role of the S&C coach in athlete rehabilitation were identified from the data: level of involvement, physical roles, and teamwork (Table 2). Participants felt that the S&C coach's current role, including involvement, physical roles, and teamwork, depends on the factors discussed in the variables theme. The results of this thematic analysis helped build a model for the current role of the S&C coach in athlete rehabilitation, as seen in Figure 1.

Participants thought that most S&C coaches currently have minimal involvement in athlete rehabilitation. It seems that physiotherapists perform most of the rehabilitation, and "S&C [coaches] will pick people up in that grey area … that exists between where physio finishes and return to play starts" (PT3). S&C coaches, therefore, mainly work in the end stages of rehabilitation. In lower-level sport settings, "physios will make all the calls around when athletes are ready to [return to sport]" (PT3). However, some highly trained S&C coaches have greater involvement, working in early rehabilitation. S&C 4 recalled that, in one setting, the S&C coach and physiotherapist "team tagged massage, we team tagged injury management" (SC4).

Table 1

Participant Characteristics

I.D.	Participant type	Interview length (hr)	Sex	Age range (years)	Level of athletes					Years working with athletes	Main sport
					L	AR	PR	AN	PN		
SC1	S&C coach	1:28:31	M	21–30	✓	✓				5	Rugby
PT1	Physiotherapist	1:16:03	M	31–40	✓	✓	✓	✓		8	Volleyball
PT2	Physiotherapist	1:01:09	M	41–50	✓			✓		5	Mixed
SC2	S&C coach	1:31:54	M	21–30	✓	✓	✓	✓	✓	5	Kayaking
PT3	Physiotherapist	1:28:17	M	31–40	✓		✓		✓	9	Rugby
SC/PT	S&C coach/physiotherapist	1:21:17	M	31–40			✓		✓	7	Cricket
SC3	S&C coach	1:10:26	M	21–30		✓	✓		✓	5	Football
PT4	Physiotherapist	1:32:31	F	21–30	✓	✓				5	Mixed
SC4	S&C coach	1:22:14	F	51–60	✓	✓	✓	✓	✓	40	Basketball

Note. AN = amateur national; AR = amateur regional; F = female; L = local; M = male; PN = professional national; PR = professional regional; PT = physiotherapist; SC = strength and conditioning.

Table 2

Categories and Themes

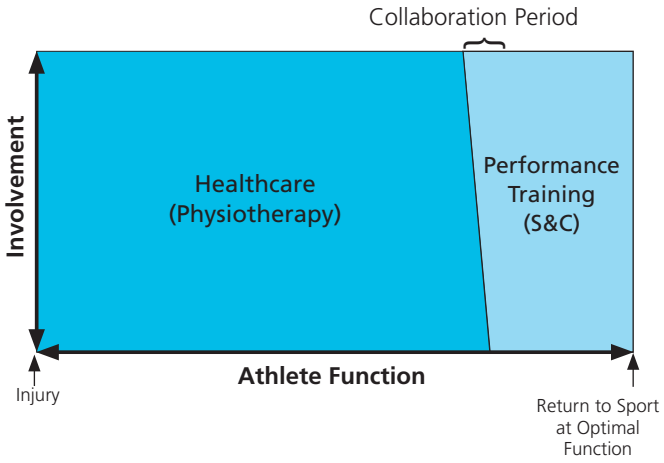
Current role	Proposed role	Variables	Significance
Teamwork with the rehabilitation team	Teamwork with the rehabilitation team	Rehabilitation team structure	Positive
Level of involvement	Level of involvement	Governance	
Physical roles	Physical roles	Relationships in the rehabilitation team	Negative
	Understanding your own role	The athlete	

The physical roles of S&C coaches that participants identified were planning and providing performance training to injured athletes. Again, how much of this S&C coaches can provide seems to be quite variable. Some S&C coaches and physiotherapists "work closely … because every day you're planning and adjusting … athletes' programmes " (PT3). More often, S&C coaches are not involved in planning rehabilitation. Some S&C coaches have found that, without their input, physiotherapist lead rehabilitation programmes that "were good in principle but … there just didn't seem to be enough resistance to make any change" (SC2). S&C coaches can help add this resistance and sport specificity, but their involvement in rehabilitation depends on their relationship with the physiotherapist and athlete.

Participant perceptions on teamwork between S&C coaches and physiotherapists were mixed: "there's been some great examples and some terrible" (SC2). Some had good experiences, working "interchangeably" (SC4) as needed, but it seems that in most cases, "people come to physio and only the lucky few end up with a strength and conditioning coach" (PT4). It was suggested that the best teamwork occurs in high-performance sport and team sport environments such as "High Performance (Sport) New Zealand" (PT2), but community sport S&C coaches often have minimal or no teamwork with physiotherapists. This is explained in more detail in the variables theme.

Figure 1

The Perceived Current Role of S&C Coaches in Athlete Rehabilitation



Proposed role

The proposed role was created based on commonly suggested roles for S&C coaches. Four main themes relating to the proposed ideal role of the S&C coach in athlete rehabilitation were identified from the data: 'level of involvement', 'physical roles', 'teamwork', and 'understanding your own role' (Table 2).

Participants felt that the S&C coach should be involved as soon as the athlete is injured. The S&C coach's role would be minimal at first, about "90:10 in favour of the physio" (SC2). As the athlete's function improves, the S&C coach's involvement would increase, and the physio's involvement should decrease. The roles may be shared "50:50 in end-stage rehab" (PT4), and then S&C coaches would have a significant role in generic specific and sport-specific development of the athlete (e.g., "99% S&C" [SC2] or "95:5" [SC4]) (Figure 2).

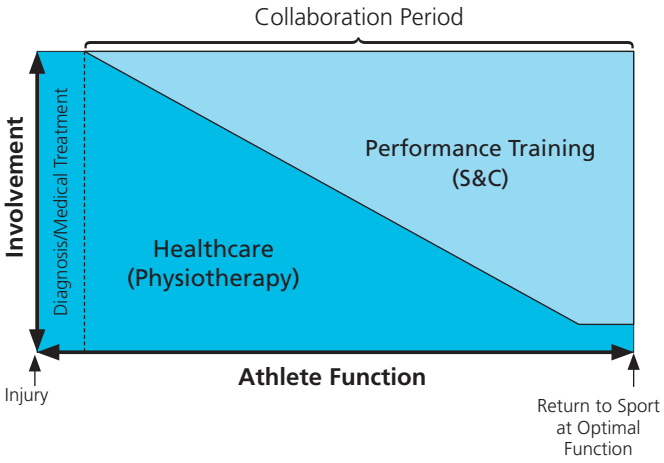
In this proposed role, S&C coaches' roles could include anything except for making the diagnosis. It was suggested that "the physio … will examine, re-evaluate, diagnose, and … manage the pain" (SC2), but S&C coaches "need to have a voice … around what the plan looks like going forwards" (SC/PT). In early rehabilitation, S&C coaches should help the physiotherapist to keep the rehabilitation "angled towards … performance outcomes" (SC/PT) and allow the athlete to stay conditioned for sport: "ankle surgery, for example … we can still do stuff with the upper body … cardiovascular [training]" (PT1). S&C coaches would have the most roles in performance training near the end of rehabilitation, adding "functionality and … individuality to the training" (SC4) to prepare the athlete for their sport.

All participants agreed that coordinating the S&C coach's and physiotherapist's roles requires excellent teamwork skills. They thought the S&C coach and medical team should regularly communicate and "work collaboratively" (PT2) throughout the athlete's complete rehabilitation (Figure 2 – collaboration period) "to try and achieve a full and sustained return to play" (PT2). They also thought that physiotherapists and S&C coaches could form a "symbiotic relationship" (PT2) and agreed they are "both required in programmes because [they] add value and … knowledge that's closely linked" (PT3).

This proposed role should be flexible, and the S&C coach must understand their role for this to happen. Participants thought "the [S&C] coach … has to know his or her limitations and refer on" (PT1). They felt that more experienced S&C coaches would have greater roles in areas they are skilled in, but ultimately "egos need to be put aside so that the athlete gets the best deal" (SC4).

Figure 2

The Proposed Role of S&C Coaches in Athlete Rehabilitation



Variables

Participants identified multiple variables that affect the role of the S&C coach in athlete rehabilitation. These variables were categorised into four main themes: 'rehabilitation team structure', 'relationships in the rehabilitation team',

'governance', and 'the athlete' (Table 2). These variables may act as barriers to S&C coaches performing their role or scenarios that require the S&C coach to adapt their role. Some may lead to a larger role for S&C coaches (Figure 3), and some lead to a larger role for physiotherapists (Figure 4).

Figure 3

S&C Coach Dominant Athlete Rehabilitation

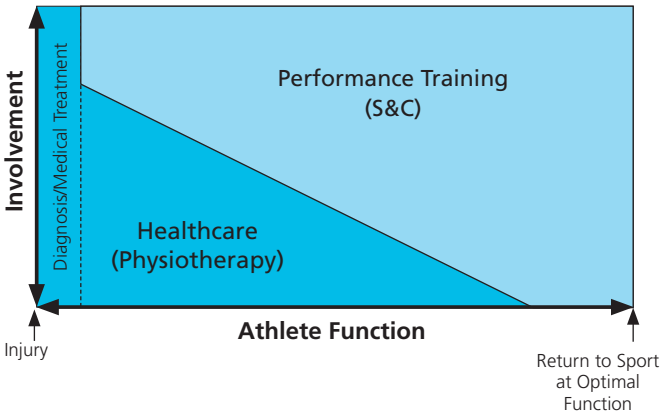
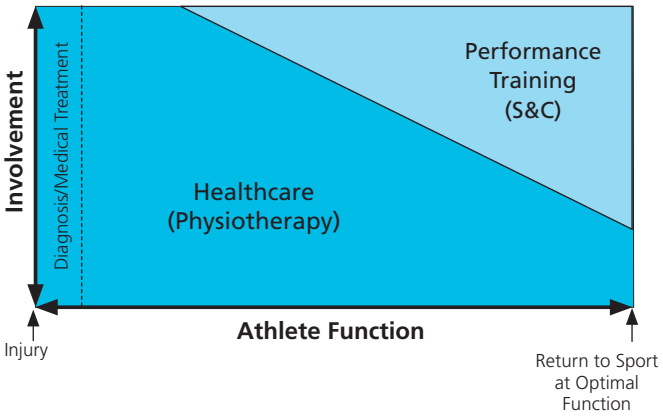


Figure 4

Physiotherapist Dominant Athlete Rehabilitation



Participants suggested that the organisation of the rehabilitation team and the skills and experience of team members determine how roles are distributed. They thought that the relative experience of the S&C coach and physiotherapist should affect how involved the S&C coach is in each section of the rehabilitation. For example, if the S&C coach is relatively more experienced in rehabilitation than the physiotherapist, then the S&C should take up more roles earlier (Figure 3) and vice versa (Figure 4). This system ensures that "whoever is leading [rehabilitation] is just whoever is best suited for the job" (SC/PT). In addition, participants thought that S&C coaches are "more involved … earlier in an interdisciplinary team … [and] later in a multidisciplinary team" (PT3).

Participants regularly discussed the relationships and communication the S&C coach has with the other rehabilitation team members and how this would affect their role. They stressed that if S&C coaches develop good relationships and communicate with the rehabilitation team, their role increases. Physiotherapist 2 thought this was because "building the relationship creates trust and … you know that they'll do a good job".

Some participants suggested that the governing structure, including accreditation and funding of S&C coaches, may also affect their roles in athlete rehabilitation. They indicated that mandatory accreditation and a governing body would help "strengthen the whole relationship between the two professions" (SC1) of physiotherapy and S&C. Physiotherapist 2 felt that referring physiotherapists "want to have some … level of comfort that, that there's … standardisation". A governing body could also set up funding structures so S&C coaches can "make a living out of it … support themselves … and have … career progression … if it's not sustainable, it won't work".

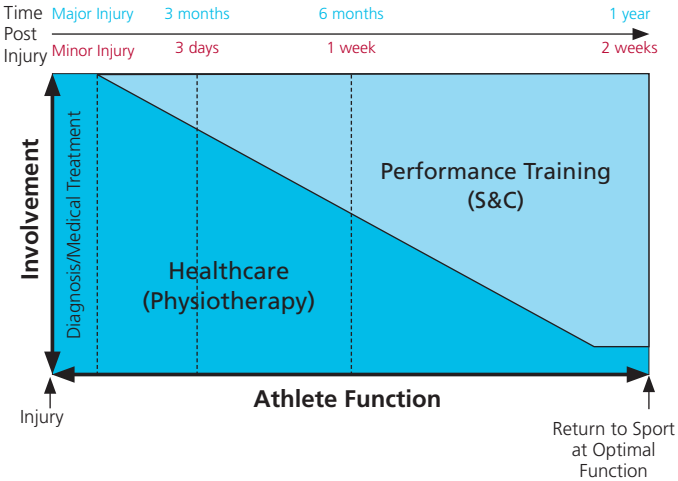
Most participants agreed that the critical variable is the athlete, as they are the focus for rehabilitation. Ultimately, athletes can choose their healthcare providers, and they may not include the S&C coach. Therefore, the athlete must understand the role of the S&C coach to see their value and comply with their programmes. "If the player … can still get by, and perform on-court … doing the bare minimum, they might go 'I can perform, why do I need to do this extra stuff?'" (PT1).

Participants thought "it depends on the level and type of sport as well" (PT1). For example, high-level sports will have more funding and resources to support an S&C coach in athlete rehabilitation, but "In the amateur side of things, it becomes … much more challenging because … generally, you don't have a physio or an S&C" (SC/PT). In addition, elite athletes are more likely to require an S&C coach to meet their performance needs. For instance, "social basketball … nobody bothers getting a [S&C] coach" (PT1).

The athlete's injury must also be considered. Participants thought that the distribution of roles between the physiotherapist and S&C coach should not change because of the severity and type of injury. They thought both should have proportionately more involvement in an injury that has a long timeframe: "it's similar. It's just on a longer scale" (SC3) (Figure 5).

Figure 5

Perceived Effect of Injury Severity on Involvement in Athlete Rehabilitation



Significance

Overall, participants felt that the role of the S&C coach is significant to athlete rehabilitation. Their comments were categorised into two themes: 'S&C coaches have a positive effect on athlete rehabilitation' and 'S&C coaches have a negative or no effect on athlete rehabilitation' (Table 2).

Participants noted multiple positive effects of involving S&C coaches in athlete rehabilitation. They saw the S&C coach as a valued member of the athlete rehabilitation team. Seven of the nine participants, including all the physiotherapists, thought the S&C coach was at least as important as the physiotherapist in athlete rehabilitation. They seem to "build a great amount of trust" (SC1) with physiotherapists and often already have "buy-in" (PT1, SC1) from athletes, which helps the rehabilitation team, as it "gets your athletes trusting you" (PT3).

S&C coaches may be able to provide additional support to physiotherapy. S&C coaches can see "athletes for a longer period of time than the physio can" (SC1). This may mean they can achieve more within one exercise session. Participants also thought physiotherapists and S&C coaches could learn from each other if they collaborate and ask questions such as, "Okay, why are we doing this? Can we do it better?" (SC3).

All participants discussed the significance of S&C coaches' performance mindsets. They thought that having the S&C coach involved helps "to find your sweet spot" (PT3), balancing health and performance goals. They thought this would lead to better athlete outcomes and improve compliance to rehabilitation "because they feel like they are training in a wellness environment, not a sickness environment, so they actually feel like they're just training" (SC4).

Overall, participants agreed that "athlete outcomes are number one" (PT3) in athlete rehabilitation, and having an S&C coach involved would lead to better outcomes. Some suggested that athletes would have "shorter time out of the game" (PT3), while others thought that "it may not improve on-time … but … they can probably get better outcomes" (PT2). Most thought that performance training and injury reduction go "hand in hand … If you're better prepared, you'll … perform better, and you're less likely to get injured" (SC3).

However, there were negatives that participants brought up as well. Some thought "there is no problem in the rehabilitation process without an S&C [coach]" (SC1). Many athletes have good outcomes in return to sport without S&C coaches. However, the same could be said of any medical professional, and 'good outcomes' are not always the best outcomes. It, therefore, seems essential to consider the context and the athlete's needs before deciding whether an S&C coach is suitable.

There were some concerns about S&C coaches and physiotherapists crossing professional boundaries. "S&C [coaches] try and get involved too early … when a player is not ready and push them too much … or vice versa, where the physios don't trust the S&C [coach]" (SC3). This could make it difficult for athletes to know what information is best for their rehabilitation: "Getting told from one guy 'look, you're not quite ready … and you've got your S&C [coach] saying, '… I think you're ready' … The athlete will be thinking … 'Who do I believe?'" (PT3).

Participants thought that negative scenarios only happened when communication and relationships between S&C coaches and the rest of the rehabilitation team are poor. If the variables listed in the above section are all considered, they thought that S&C coaches would positively affect athlete rehabilitation.

DISCUSSION

To our knowledge, this is the first study that has explored the perceptions of physiotherapists and S&C coaches on the role of the S&C coach in athlete rehabilitation. The themes in this study were analysed in four categories. These themes in their respective categories were: current role (teamwork with the rehabilitation team, level of involvement, and physical roles), proposed role (teamwork with the rehabilitation team, level of involvement, and physical roles), variables (rehabilitation team structure, governance, relationships in the rehabilitation team, and the athlete), and significance (positive and negative).

This study adds to emerging literature that attempts to clarify the role of S&C coaches in athlete rehabilitation. Previous literature provides a general framework (Kraemer et al., 2009; Lorenz et al., 2010; Maestroni et al., 2020; Reiman & Lorenz, 2011). This study explored the perceptions of S&C coaches and physiotherapists to clarify how the role is currently performed and how they think it should be performed.

The current role of the S&C coach was not clearly defined across all participants, but a spectrum of roles could be ascertained. Perceptions on the role of the S&C coach in athlete rehabilitation were mixed, suggesting that S&C coaches perform various roles depending on the S&C coach and the context. The spectrum of roles spans from not involved at all to only involved in performance training during the end stages of rehabilitation to involved throughout the whole rehabilitation process. It seems that most are either not involved or only involved in end-stage rehabilitation, but S&C coaches with high skill levels or in highly collaborative team environments will have a much more significant role. Most agreed that S&C coaches who have minimal involvement in athlete rehabilitation should be more involved.

Participants had a much more consistent proposed role for the S&C coach in athlete rehabilitation. They thought S&C coaches should have some involvement following a health professional's diagnosis, and their greatest involvement should be in the performance training of injured athletes. The athlete has a greater need for performance training as their function improves. Therefore, participants suggested that the S&C coach's role should be small at first but increase as athlete function improves and the physiotherapist's role decreases. Therefore, S&C coaches and physiotherapists would be required to collaborate throughout the whole rehabilitation process, and their teamwork would have to be excellent. In addition, participants agreed that the S&C coach's role must be flexible and account for contextual and personal variables in the athlete's rehabilitation.

S&C coaches seem to perform their role in athlete rehabilitation more easily in interdisciplinary teams than multidisciplinary

teams. However, if multidisciplinary teams communicate well, then the S&C coach can still perform their role. Many rehabilitation teams are multidisciplinary. Patients are sequentially passed between health professionals with minimal collaboration (Chamberlain-Salaun et al., 2013; Körner, 2010). This seems to be how most S&C coaches are currently included in rehabilitation teams, especially in community sport settings. Participants thought interdisciplinary teams, which have greater collaboration (Chamberlain-Salaun et al., 2013; Körner, 2010), are preferable for S&C coaches to perform their role. Participants who worked in interdisciplinary teams were usually involved in high-level sport or team sports on a contract basis. This allows S&C coaches and physiotherapists to have regular informal and formal, face-to-face communication. Therefore, they can collaborate efficiently in the planning and implementation of rehabilitation: "you've got S&C [coaches] you work closely with them because every day you're planning and adjusting players' and athletes' programmes" (PT3). Therefore, professionals in community settings (i.e., multidisciplinary teams) will have to be more creative with their communication methods to improve relationships and collaboration. Participants suggested phone calls, text messages, email, video calls, organising face-to-face meetings, or attending gym or physiotherapy sessions.

Once teams are collaborating effectively, it is easier to organically understand and distribute roles to suit each other's strengths (Green & Johnson, 2015; Rosen et al., 2018; Sims et al., 2015). Participants saw the importance of this and commented that S&C coaches and physiotherapists need to understand their own roles as well as each other's to ensure that tasks are distributed to "whoever is best suited for the job" (SC/PT). This must be decided on multiple factors, including their knowledge and practical skills, personality, relationships with the athlete, and rehabilitation team members. The critical variable identified by participants is the athlete. Therefore, the proposed role of S&C coaches takes a 'patient-centred approach' (Rathert et al., 2013). Athletes must understand and value what S&C coaches can provide to involve them in their rehabilitation.

Participants identified the current governing structure of S&C as a barrier to S&C coaches performing their role in athlete rehabilitation. S&C does not have a nationally recognised governing body in New Zealand, and they are not obligated to gain qualifications to practice. SC4 described it as "a cowboy industry". Many employers will expect experience or qualifications. However, to health professionals, who are not as well informed, it may be hard to assess an S&C coach's competence without knowing them personally. This may also explain why S&C coaches seem to perform their role more easily in interdisciplinary teams. Their education is so variable that many need to develop and understand their role through face-to-face collaboration with health professionals. Ultimately, S&C coaches who do not have personal relationships with health practitioners will receive fewer referrals and will not develop this role. A governing body may highlight the importance of the S&C coach's role in athlete rehabilitation, provide more consistent education and competency thresholds, and create funding structures for S&C coaches. If S&C coaches cannot get paid for their work in rehabilitation, it will not be sustainable.

Research implications

This is the first qualitative study to assess the role of the S&C coach in athlete rehabilitation. Although this study provides the perceptions of S&C coaches and physiotherapists of the role, further research on perceptions of other rehabilitation team members would help clarify the proposed role and their understanding of the role. Most notably of these team members would be the athlete themselves, because, ultimately, the athlete will be the one deciding their rehabilitation pathway.

Furthermore, the proposed role of the S&C coach identified in this paper could be tested through quantitative research. For example, researchers could develop a randomised controlled trial that compares S&C coaches working collaboratively in this proposed role versus a control of standard physiotherapy. A study like this could assess rehabilitation time, rehabilitation outcomes, performance outcomes, and injury recurrence with and without the input of S&C coaches. Future studies should focus on this type of research to assess whether the proposed role of S&C coaches is effective in athlete rehabilitation.

Strengths and limitations

The sample size of nine participants interviewed in this study is relatively small but adequate for saturation of homogenous groups (Guest et al., 2006). While a mix of physiotherapists and S&C coaches may not be considered homogenous, participants were linked through their experience in athlete rehabilitation and agreed on many ideas. In addition, both physiotherapists and S&C coaches were equally represented in this study. As the ninth interview provided no further subthemes, data saturation was achieved.

A key strength of this paper is that it provides a 'real world' perspective of the role of S&C coaches in athlete rehabilitation. While this may not capture the views of all physiotherapists and S&C coaches, it gives insight into the opinions of those who have experience in rehabilitating athletes. Quantitative data does not further support this, but it provides fertile ground for future study and clinical application. Therefore, the proposed role should be tested in research and clinically in athlete rehabilitation teams.

Purposive sampling could be considered a key limitation of this paper. This sampling strategy risks bias of the researcher impacting the selection process, but heterogeneous sampling helped ensure diversity among participants. The participants selected represent a range of ages, experiences, and education and have worked with various sports and competitive levels. The two female and seven male participants correlate well with S&C coach (Dwyer et al., 2019; Jones et al., 2019) and sport physiotherapy populations (Öhman et al., 2001). Although physiotherapy is female-dominated overall (Physiotherapy Board of New Zealand, 2020; Reid & Dixon, 2018), men are more likely to be involved in sports physiotherapy (Dahl-Michelsen, 2014; Öhman et al., 2001). Even so, the participants selected were from New Zealand, and their views may not represent physiotherapists and S&C coaches in other countries where processes and professional roles differ.

CONCLUSION

This study found that physiotherapists and S&C coaches in New Zealand do not think S&C coaches can perform their role in rehabilitation optimally. These participants believed S&C coaches should have much more involvement and collaboration with physiotherapists in athlete rehabilitation. However, there are multiple barriers to their role. A key barrier is a lack of role clarity. This study should help to clarify the S&C coach's role in rehabilitation and help rehabilitation teams understand the variables that affect this role. This may lead to more opportunities for S&C coaches to work in athlete rehabilitation.

KEY POINTS

1. Physiotherapists and S&C coaches proposed that S&C coaches should provide performance training and a performance context for athlete rehabilitation.
2. Physiotherapists and S&C coaches suggested that S&C coaches and health professionals should communicate in early rehabilitation, and S&C coach involvement should increase with athlete function.
3. S&C coaches and health professionals should collaborate during athlete rehabilitation to distribute roles that suit the strengths of each professional and the needs of the athlete.

DISCLOSURES

No funding was obtained for this study. The primary author was a physiotherapist and S&C coach. This was identified as a potential conflict of interest and was ameliorated by making participants aware of the author's background and cross-checking themes with the other authors. There are no other conflicts of interest that may be perceived to interfere with or bias this study.

PERMISSIONS

Ethical approval was obtained from the Otago Polytechnic Research Ethics Committee (reference number 840). All participants provided verbal and written informed consent.

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Appendix A

INTERVIEW PROMPTS

1. Introduction

Introduction
- Ask for consent to record
  - We can stop at any time
  - It is ok not to answer any of the questions
  - Any identifying information in this interview will be kept anonymous
- Introduce myself and a little about my background
- Please tell me about your experience with being / strength and conditioning (S&C) coaches being involved in athlete rehabilitation
  - Positives? Negatives?
  - How has your experience differed when you have been / an S&C involved by comparison to not involved?
  - How would the outcome of athlete rehabilitation change with the inclusion/exclusion of a strength and conditioning coach in the rehab team?
  - Prompt: Tell me more about… why do you say it would…?
- Who do you think have been the most important members of the rehabilitation team in determining athlete return to sport outcomes?
  - Why? (e.g., minor ankle sprain vs major ankle surgery)
- What do you believe should be the role of the S&C in athlete rehabilitation?
  - Prompt: Tell me more about…
  - Significance?
  - How does this ideal differ to your experience? (perceived ideal vs perceived actual)
    - Is this role you have described practical today?
    - What influences the role they may have? Are there any barriers to them performing their role?
    - What would have to change to achieve the ideal role?
  - Has the role changed during your time working as an S&C/physio?

2. Idea formation

Tell me about your experiences working in athlete rehabilitation teams.
- Can you please discuss the collaboration and communication there has been in these rehab teams?
  - How do you communicate with S&Cs?
  - How often do you communicate with S&Cs?
  - How closely do you communicate with S&Cs?
- What did the S&C have to offer in the team that you have described? / How may the team and outcome have changed if an S&C was involved?

Multidisciplinary = usually not working in the same building, most communication is over the phone, email etc.
Interdisciplinary = working closely together and collaborating regularly with face-face communication, often with team meetings.
- How did your experience in an interdisciplinary team differ from your experience in a multidisciplinary team?
- How does the S&C's role change between different teams?

How would your perceptions change if S&C coaches were obligated to gain certification under a nationally recognised governing body?
- Ideas to expand upon
  - e.g., You mentioned "x". Can we go a little deeper into this idea?
  - e.g., Earlier you said "x". Why do you think this is? Can you help me understand this a little better?

3. Idea clarity

It has been suggested that, in the rehabilitation continuum, physiotherapists and S&C coaches should work together in 'end-stage rehabilitation' and the S&C coach should then take over to provide performance training before return to sport.
- To what extent do you agree or disagree with this? (perceived ideal vs literature ideal)
  - In your experience, how does this differ from what actually happens in athlete rehabilitation? (Perceived actual vs literature ideal)
- Ideas to clarify
  - e.g., So far, I'm getting the idea that "x". Can you help me develop this idea?
  - e.g., You said that "x". Can you just help make this idea a little clearer for me?

What additional comments you would like to make with regards to this study?

Benchmarking Physiotherapists' Usual Care for Total Hip and Knee Joint Arthroplasty in Australia and New Zealand

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ABSTRACT

This study presents findings from a benchmarking survey describing reported practice in Australia and New Zealand for pre- and post-operative total joint arthroplasty management. The aim of this study was to identify differences in service delivery between both public and private healthcare sectors and geographical regions. Surveys were sent to senior physiotherapists and undertaken online. Responses were received from 125 institutions. Predicted length of stay (LOS) varied across regions with most therapists reporting an agreed LOS of ≥ 3 days (83% total hip arthroplasty; 89% total knee arthroplasty). Significantly longer LOS was reported in the private healthcare sector ($p = 0.001$). Patients in New Zealand and Western Australia were reported as more likely to be discharged directly home following total hip arthroplasty ($p = 0.001$) and total knee arthroplasty ($p < 0.001$) compared with other regions. The majority of physiotherapists suggested they would mobilise patients on post-operative day 0 (total hip arthroplasty 53%; total knee arthroplasty 55%), with both hospital and patient factors cited as barriers to early mobility. Heterogeneity of care across both healthcare sector and region is prevalent following elective total joint arthroplasty in Australia and New Zealand. Research opportunities regarding optimal management remain, particularly in regard to discharge destination, length of stay, and timing of first mobility.

Hart, J., Tarrant, K., Liew, S., & Kimmel, L. (2021). Benchmarking physiotherapists' usual care for total hip and knee joint arthroplasty in Australia and New Zealand. *New Zealand Journal of Physiotherapy, 49*(3), 99–111. https://doi.org/10.15619/NZJP/49.2.06

Key Words: Arthroplasty, Australia, Benchmarking, New Zealand, Physiotherapy

INTRODUCTION

Total joint arthroplasty (TJA) has been shown to improve function, pain, and quality of life for people living with severe joint disease such as osteoarthritis who have failed conservative management (Churches et al., 2019). In New Zealand in 2018, 9,186 primary total hip arthroplasties (THA) and 8,392 primary total knee arthroplasties (TKA) were performed across both the private and public healthcare sectors (The New Zealand Joint Registry, 2019). In the same year across Australia, 39,005 primary THA and 56,147 primary TKA were completed (Australian Orthopaedic Association National Joint Replacement Registry, 2018). In 2012/13, the cost of TJA to the Australian healthcare system was over $2.3 billion (Australian Commission on Safety and Quality in Health Care, 2014). Given that conservative projections suggest that by 2046, Australia could be completing 94,086 THAs and 105,971 TKAs (Inacio et al., 2017), it is important to reduce unwarranted variation in rehabilitation and optimise management from both a health-related quality of life and health economic perspective (Australian Commission on Safety and Quality in Health Care, 2014; Australian Institute of Health and Welfare, 2019b). Similarly, in New Zealand, it is predicted that the absolute number of TJA will increase with a projected increase of THA by 84% and TKA by 183% from 2001 to 2026 (Hooper et al., 2014).

Heterogeneity in management of individuals following TJA has been reported across multiple domains. The Royal Australasian College of Surgeons (2018) suggested clinical variation following TJA may be a sign of system inefficiencies and therefore opportunity for improvement. Physiotherapy plays an essential role in the perioperative care of patients undergoing TJAs; however, variations in practice have been described in the acute and sub-acute settings (Artz et al., 2013; Jones et al., 2016). In a cohort of privately funded patients in Australia, patient-related factors explained only 24.6% of the variance in inpatient rehabilitation rates post-TKA with surgeon- or hospital-related factors comprising the remaining 75.4% (Schilling et al., 2018).

It is important that a benchmarking study includes both public and private hospitals to determine if patients are managed differently across these organisations. In both Australia and New Zealand, surgeons can work in private or public institutions (or both) and, as such, variation in management across these

jurisdictions is of interest (Derrett et al., 2009). In Australia and New Zealand, all patients can receive access to TJA in the public system (Australian Government Services Australia, 2020; Lao et al., 2019). Private insurance funds most TJA in Australia (TKA 70.7% and THA 59.9% in 2019) (Australian Orthopaedic Association National Joint Replacement Registry, 2020), while in New Zealand most TJA are publicly funded (TKA 59% and THA 54% between 2005 and 2016), with others receiving TJA through private insurance and the Accident Compensation Corporation (Lao et al., 2019). Inpatient rehabilitation is offered by most private insurance companies in Australia, although for a pre-determined limited period of time (Naylor et al., 2019), whereas in New Zealand, follow-up rehabilitation care is described as occurring in the outpatient setting (Snell et al., 2020).

The primary purpose of this benchmarking survey was to describe reported current practice in Australia and New Zealand following TJA, especially in pre- and post-operative management. Additionally, we aimed to identify any differences in service delivery between the public and private healthcare sector or between regions in Australia and New Zealand and highlight potential areas for improvement.

METHODS

This online benchmarking survey was designed to inform current usual care in the pre-operative and early post-operative phase after elective primary TJA in Australia and New Zealand and to identify any variations in practice between regions or between private and public hospital systems.

Study data were collected and managed using REDCap (Research Electronic Data Capture) electronic data capture tools hosted at the Alfred Hospital, Melbourne (Harris et al., 2009; Harris et al., 2019).

As no validated tool existed for benchmarking management following TJA, a survey was designed using both open- and closed-ended questions. Questions were informed by previous surveys completed documenting physiotherapy management of individuals following TJA (Jones et al., 2016; Naylor et al., 2006). The survey questions were reviewed and piloted by a group of senior physiotherapists and researchers. Based on their feedback, the survey was modified and finalised (available upon request from authors). Questions addressed TKA and THA individually and were grouped into pre-operative management, early post-operative management, and discharge planning/follow up.

The Australian and New Zealand Orthopaedic Associations' Joint Registry 2018 reports were used to identify hospitals which performed TJA (Australian Orthopaedic Association National Joint Replacement Registry, 2018; The New Zealand Joint Registry, 2019). Physiotherapy managers at each site were contacted via phone or email with a request for the contact email of the most senior physiotherapist responsible for the care of individuals following TJA. In cases where there was no physiotherapy department at a hospital site, the relevant contracted private physiotherapy practice was contacted where possible. The survey was then distributed via REDCap to the relevant physiotherapist between 28 November 2019 and 14 January 2020. Up to two reminders were sent by email through REDCap to non-responders two to four weeks after initial distribution to maximise response rates.

Those included in the study were allied health managers or physiotherapists who worked in hospitals listed in the 2018 Australian or New Zealand Joint Registry report. Exclusion criteria encompassed:

- hospital no longer completing TJA as at June 2019
- hospital closure
- hospital not routinely completing primary TJA in adults (children's hospital, oncology hospital, trauma hospital)
- no physiotherapy department or no primary physiotherapist responsible for overseeing the management of individuals following TJA at a hospital site
- requests for modification to approved ethics application following survey distribution

Ethics approval was granted by the Alfred Hospital Ethics Committee (project number 365/19).

Participants were provided with information in an email from REDCaps that included a link to access the survey. Participants indicated consent to participate by completion of the survey; therefore, any incomplete responses were not included in the analysis. The data were sub-grouped for analysis, comparing both public and private healthcare settings, and regions/states. Given the small number of hospitals in the Northern Territory, Australian Capital Territory, and Tasmania, their data were pooled together to maintain anonymity. New Zealand was treated as one region equivalent to a state. Where hospitals provided a length of stay (LOS) range (e.g., 3–5 days), the mean was used for the purpose of data analysis.

Statistical analyses

Data were divided into private and public hospital information and into states/regions for comparisons. Chi-squared or Fisher's exact tests (if cells contained fewer than five cases) were used for categorical data. Mann Whitney U or Kruskal Wallis tests were used to compare continuous data for groups that were non-parametric (Gaddis & Gaddis, 1990). Data were analysed using Stata 14.0 (StataCorp, 2015). A p value < 0.05 was deemed to be significant.

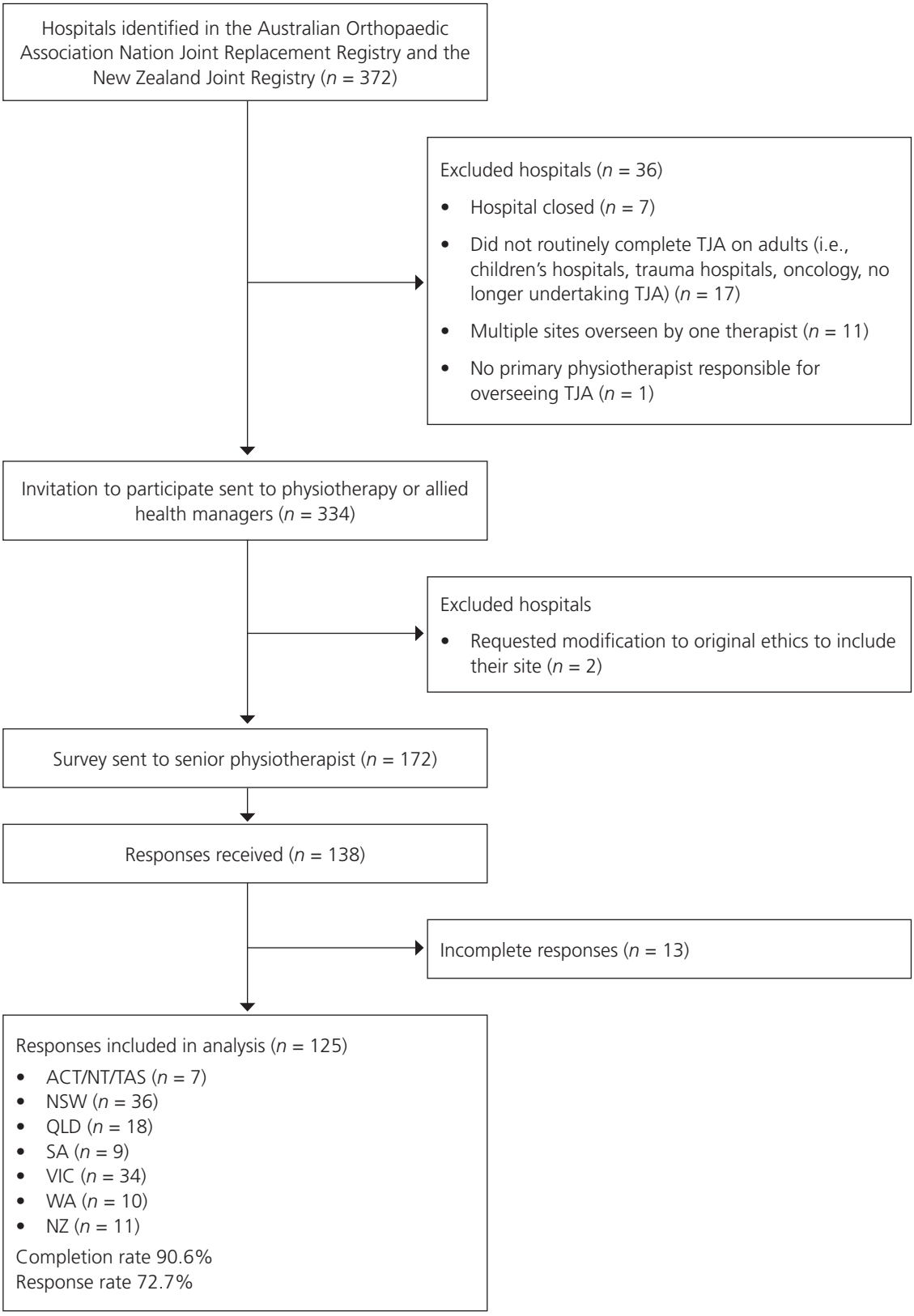
RESULTS

The analyses included 125 responses, which accounted for 72.7% of all surveys sent to senior physiotherapists (Figure 1). Of the hospitals reported on, 44 were private, with 81 undertaking publicly funded TJA. All the hospitals reported undertaking both THA and TKA.

Differences in both hospital- and patient-related factors were reported between public and private hospital settings (Tables 1 and 2) and between regions (Tables 3 and 4). Regional differences in agreed mean LOS for THA and TKA were evident, reported as 3.5 days for TKA and 3.2 days for THA. Physiotherapists in New Zealand were more likely to report an agreed LOS of 3 days or less for both THA ($p = 0.011$) and TKA ($p = 0.029$). There was a significant difference between

Figure 1

Flow Diagram of Completion and Response Rates



Note. ACT = Australian Capital Territory; NSW = New South Wales; NZ = New Zealand; NT = Northern Territory; QLD = Queensland; SA = South Australia; TAS = Tasmania; TJA = total joint arthroplasty; VIC = Victoria; WA = Western Australia.

regions in terms of discharge destination following both TKA ($p < 0.001$) and THA ($p = 0.001$). Overall, the proportion of individuals discharged directly home was >75% at 70.4% of sites following THA and 65.6% following TKA (Table 4; see Appendices A and B for details on discharge criteria). The most common perceived barriers to early mobility on post-operative day 0 (POD0) were both hospital/staffing-related factors and medical status or anaesthetic choice (Table 5). Physiotherapists were more likely to report a range of movement goal for TKA prior to discharge in the public system (Appendix C, $p = 0.049$).

DISCUSSION

This is the largest benchmarking study completed examining usual care of individuals undergoing TJA in Australia and New Zealand from preadmission through to post-operative care. Across this jurisdiction, more TJAs are performed in private than public institutions, which was reflected in our response rate (Australian Commission on Safety and Quality in Health Care, 2014). The main finding of this benchmarking survey was a difference in the management of patients in the public and private sectors, with private institutions reporting a longer

Table 1

Demographic and Hospital Factors in Private and Public Hospitals (N = 125)

Descriptor	Total		Private hospital		Public hospital		*p*
	Mdn	IQR	*Mdn*	IQR	*Mdn*	IQR	
THA per annum	143	73–227	200	90–325	100	67–200	< 0.001
TKA per annum	150	88–300	225	90–510	125	81–215	< 0.001
	n	%	*n*	%	*n*	%	*p*
Pre-operative education							
Yes	98	78.4	32	72.3	66	81.5	0.256
No	27	21.6	12	27.3	15	18.5	
Is LOS predicted prior to hospital admission?							
Yes	78	62.4	28	63.6	50	61.7	0.833
No	47	37.6	16	36.4	31	38.3	
Use of discharge predictor tool							
Yes	24	19.2	6	13.6	18	22.2	0.244
No	101	80.8	38	86.4	63	77.8	
Physiotherapy hours, Monday to Friday							
Business hours only	106	84.8	30	68.2	76	93.8	< 0.001
Early/late service	19	15.2	14	31.8	5	6.2	
Physiotherapy hours, Saturday and Sunday							
Reduced/priority	61	48.8	13	29.5	48	59.3	0.001
Business hours only	49	39.2	26	59.1	23	28.4	
Early/late service	4	3.2	3	6.8	1	1.2	
No service	4	3.2	1	2.3	3	3.7	
Other	7	5.6	1	2.3	6	7.4	
Use of clinical pathway for TJA							
Yes	88	70.4	32	72.7	56	69.1	0.674
No	37	29.6	12	27.3	25	30.9	
Agreed LOS for THA							
< 3 days	21	16.8	5	11.4	16	19.8	0.096
3 days	57	45.6	17	38.6	40	49.4	
> 3 days	47	37.6	22	50	25	30.9	
Agreed LOS for TKA							
< 3 days	13	10.4	1	2.3	12	14.8	0.001
3 days	51	40.8	12	27.3	39	48.1	
> 3 days	61	48.8	31	70.5	30	37	

Note. IQR = interquartile range; LOS = length of stay; THA = total hip arthroplasty; TJA = total joint arthroplasty; TKA = total knee arthroplasty.

Table 2

Patient-related Factors in Private and Public Hospitals (N = 125)

Descriptor	Total		Private hospital		Public hospital		*p*
	n	%	*n*	%	*n*	%	
Physiotherapist would review patient POD0							
THA							
Yes	77	61.6	33	75.0	44	54.3	0.023
No	48	38.4	11	25.0	37	45.7	
TKA							
Yes	83	66.4	34	77.3	49	60.5	0.058
No	42	33.6	10	22.7	32	39.5	
Physiotherapist would stand/ ambulate patient on POD0							
THA							
Yes	66	52.8	30	68.2	36	44.4	0.011
No	59	47.2	14	31.8	45	55.6	
TKA							
Yes	69	55.2	31	70.5	38	46.9	0.011
No	56	44.8	13	29.5	43	53.1	
Nursing staff mobilise patients prior to physiotherapy review							
Yes	15	12.0	9	20.5	6	7.4	0.032
No	110	88.0	35	79.5	75	92.6	
Number of physiotherapy sessions daily							
< 1	1	0.8	1	2.3	0	0	0.225
1	64	51.2	19	43.2	45	55.6	
2	59	47.2	24	54.5	35	43.2	
> 2	1	0.8	0	0	1	1.2	
Routine THA precautions (posterior approach)							
Yes	110	88.0	39	88.6	71	87.7	0.872
No	15	12.0	5	11.4	10	12.3	
Routine THA precautions (anterior approach)							
Yes	55	44.0	23	52.3	32	39.5	0.430
No	19	15.2	6	13.6	13	16.0	
N/A	51	40.8	15	34.1	36	44.4	
Routine occupational therapy							
THA							
Yes	96	76.8	20	45.5	76	93.8	<0.001
No	29	23.2	24	54.5	5	6.2	
TKA							
Yes	85	68.0	14	31.8	71	87.7	<0.001
No	40	32.0	30	68.2	10	12.3	
Percentage of patients discharged directly home							
THA							
< 75%	37	29.6	14	31.8	23	28.4	0.689
≥ 75%	88	70.4	30	68.2	58	71.6	
TKA							
< 75%	43	34.4	20	45.5	23	28.4	0.055
≥ 75%	82	65.6	24	54.5	58	71.6	
Routine follow-up							
THA							
Yes	95	76.0	31	70.5	64	79	0.285
No	30	24.0	13	29.5	17	21	
TKA							
Yes	117	93.6	39	88.6	78	96.3	0.128
No	8	6.4	5	11.4	3	3.7	

Note. THA = total hip arthroplasty; TKA = total knee arthroplasty; POD0 = post-operative day 0.

Table 3

Demographic and Hospital Factors Across Regions (N = 7)

Descriptor	ACT/NT/TAS *n* = 7		NSW *n* = 36		QLD *n* = 18		SA *n* = 9		VIC *n* = 34		WA *n* = 10		NZ *n* = 11		*p*
	Mdn	IQR	*Mdn*	IQR	*Mdn*	IQR	*Mdn*	IQR	*Mdn*	IQR	*Mdn*	IQR	*Mdn*	IQR	
THA per annum	100	25–300	150	80–200	150	64–129	200	60–300	146	70–272	95	75–234	145	125–220	0.981
TKA per annum	150	41–300	165	90–260	165	100–350	200	60–385	132	88–271	127	90–344	137	100–176	0.988
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*p*
Pre-operative education															
Yes	4	57.1	28	77.8	13	72.2	8	88.9	28	82.4	8	80.0	9	81.8	0.797
No	3	42.9	8	22.2	5	27.8	1	11.1	6	17.6	2	20.0	2	18.2	
Is LOS predicted prior to hospital admission?															
Yes	4	57.1	23	63.9	9	50.0	8	88.9	23	67.6	5	50.0	6	54.5	0.493
No	3	42.9	13	36.1	9	50.0	1	11.1	11	32.4	5	50.0	5	45.5	
Use of discharge predictor tool															
Yes	1	14.3	2	5.6	2	11.1	3	33.3	14	41.2	2	20.0	0	0	0.002
No	6	85.7	34	94.4	16	88.9	6	66.7	20	58.8	8	80.0	11	100	
Physiotherapy hours, Monday to Friday															
Business hours only	6	85.7	33	91.7	14	77.8	8	88.9	27	79.4	8	80.0	10	90.9	0.734
Early/late service	1	14.3	3	8.3	4	22.2	1	11.1	7	20.6	2	20.0	1	9.1	
Physiotherapy hours, Saturday and Sunday															
Reduced/ priority	4	57.1	19	52.8	10	55.6	2	22.2	16	47.1	4	40.0	6	54.5	0.754
Business hours	2	28.6	13	36.1	8	44.4	5	55.6	12	35.3	5	50.0	4	36.4	
Early/late service	0	0	1	2.8	0	0	1	11.1	2	5.9	0	0	0	0	
No service	1	14.3	0	0	0	0	0	0	1	2.9	1	10	1	9.1	
Other	0	0	3	8.3	0	0	1	11.1	3	8.8	0	0	0	0	
Use of clinical pathway for TJA															
Yes	4	57.1	29	80.6	9	50.0	6	66.7	22	64.7	9	90.0	9	81.8	0.169
No	3	42.9	7	19.4	9	50.0	3	33.3	12	35.3	1	10.0	2	18.2	
Agreed LOS															
THA															
< 3 days	0	0	8	22.2	2	11.1	0	0	3	8.8	4	40.0	4	36.4	0.011
3 days	3	42.9	10	27.8	10	55.6	4	44.4	18	52.9	6	60.0	6	54.5	
> 3 days	4	57.1	18	50.0	6	33.3	5	55.6	13	38.2	0	0	1	9.1	
TKA															
< 3 days	0	0	7	19.4	1	5.6	1	11.1	1	2.9	0	0	3	27.3	0.029
3 days	2	28.6	10	27.8	7	38.9	2	22.2	16	47.1	7	70.0	7	63.6	
> 3 days	5	71.4	19	52.8	10	55.6	6	66.7	17	50.0	3	30.0	1	9.1	

Note. ACT = Australian Capital Territory; IQR = interquartile range; Med = median; LOS = length of stay; NSW = New South Wales; NZ = New Zealand; NT = Northern Territory; QLD = Queensland; SA = South Australia; TAS = Tasmania; THA = total hip arthroplasty; TJA = total joint arthroplasty; TKA = total knee arthroplasty; VIC = Victoria; WA = Western Australia.

Table 4

Patient-related Factors Across Regions (N = 7)

Descriptor	ACT/NT/TAS *n* = 7		NSW *n* = 36		QLD *n* = 18		SA *n* = 9		VIC *n* = 34		WA *n* = 10		NZ *n* = 11		*p*
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	
Nursing staff routinely mobilise patients before physiotherapy review															
Yes	1	14.3	1	2.8	2	11.1	0	0	5	14.7	1	10.0	5	45.5	0.020
No	6	85.7	35	97.2	16	88.9	9	100	29	85.3	9	90.0	6	54.5	
Routine THA precautions (posterior approach)															
Yes	7	100	33	91.7	14	77.8	9	100	27	79.4	9	90.0	11	100	0.305
No	0	0	3	8.3	4	22.2	0	0	7	20.6	1	10	0	0	
Routine occupational therapy															
THA															
Yes	7	100	30	83.3	14	77.8	4	44.4	27	79.4	8	80.0	6	54.5	0.091
No	0	0	6	16.7	4	22.2	5	55.6	7	20.6	2	20.0	5	45.5	
TKA															
Yes	6	85.7	27	75.0	12	66.7	4	44.4	22	64.7	8	80.0	6	54.5	0.472
No	1	14.3	9	25.0	6	33.3	5	55.6	12	35.3	2	20.0	5	45.5	
Percentage of patients discharged directly home															
THA															
< 75%	1	14.3	12	33.3	3	16.7	2	22.2	19	55.9	0	0	0	0	0.001
≥ 75%	6	85.7	24	66.7	15	83.3	7	77.8	15	44.1	10	100	11	100	
TKA															
< 75%	1	14.3	13	36.1	4	22.2	2	22.2	23	67.6	0	0	0	0	< 0.001
≥ 75%	6	85.7	23	63.9	14	77.8	7	77.8	11	32.4	10	100	11	100	

Note. ACT = Australian Capital Territory; NSW = New South Wales; NZ = New Zealand; NT = Northern Territory; QLD = Queensland; SA = South Australia; TAS = Tasmania; THA = total hip arthroplasty; TKA = total knee arthroplasty; VIC = Victoria; WA = Western Australia.

Table 5

Reported Barriers to Earlier Mobility

Barriers	*n*	% [a]
Medical status including anaesthetic choice/use of nerve blocks	67	53.6
Staffing/resources (including late return to ward and no staff available)	67	53.6
Surgeon preference	37	29.6
Available evidence/local practice	11	8.8
No barriers to early mobility reported	10	8.0
Stairs are the only thing that would not be trialled on post-operative day 0 in the medically well patient	7	5.6

[a] Percentage ≠ 100 as some sites reported multiple barriers to earlier mobility.

agreed LOS, increased access to mobilisation on POD0 and a 7 rather than a 5-day service. Regional differences were also shown in agreed LOS and the percentage of patients discharged directly home as opposed to inpatient rehabilitation. Wide variations were found in post-operative management such as use of precautions and early mobilisation, and consideration should be given to the development of guidelines by an expert multidisciplinary team including surgeons, nursing, and allied health that could facilitate more standard care for patients regardless of funding models or jurisdiction.

Therapists in private hospitals reported a significantly longer agreed LOS for individuals following TKA than their public counterparts ($p = 0.001$), despite reports that privately funded patients have less comorbidities than those funded publicly (Naylor et al., 2019). LOS may be longer in private hospitals, as private health insurers provide inpatient rehabilitation funding for a pre-determined LOS (rather than as needed). A regional difference in agreed LOS was identified for both THA ($p = 0.011$) and TKA ($p = 0.029$), with the shortest agreed LOS reported in New Zealand (mean THA = 2.8 days, mean TKA = 2.8 days) and Western Australia (mean THA = 2.6 days, mean TKA = 3.3 days), and the longest reported in Australian Capital Territory/Northern Territory/Tasmania (mean THA 3.7 days, mean TKA = 3.9 days). The agreed LOS reported by therapists in New Zealand following THA and TKA is shorter than the median LOS of 4 days reported in these populations in 2017 (Proudfoot et al., 2017).

As health insurance status and surgeon affiliation, as well as patient-related factors, have been identified as potential predictors of discharge destination following THA (London et al., 2016; Schilling et al., 2018), use of a validated outcome tool to predict LOS may assist in decreasing unwarranted variation between health services. While the majority of respondents (62.4%) reported predicting LOS prior to admission, only 30.8% of those reported use of a discharge prediction tool. These 24 sites all used the Risk Assessment and Prediction tool (RAPT), which has demonstrated utility in both decreasing LOS following TJA and identifying those who benefit from targeted intervention to reduce risk of delayed post-operative recovery (Sconza et al., 2019). Patients' expectations have been found to have an influence on discharge setting and LOS, and use of the RAPT can identify individuals who may benefit from pre-operative counselling and education (Sconza et al., 2019). Surgeons' recommendations and hospital factors also influence patient discharge disposition and this could be further investigated to reduce unwarranted variation in care (London et al., 2016; Schilling et al., 2018). Despite growing interest in 'outpatient' TJA (Meneghini et al., 2018), most therapists (83% THA, 89% TKA) reported an agreed LOS of 3 or more days and many still utilise inpatient rehabilitation. Significant changes would need to be undertaken in order to facilitate widespread uptake of outpatient TJA in this jurisdiction.

No significant difference in perceived numbers of individuals discharged directly home following TJA was reported by physiotherapists in public and private hospitals across Australia and New Zealand. A recent prospective study completed in Australia found privately funded patients were more likely to discharge to inpatient rehabilitation following both TKA and THA (Naylor et al., 2019). In Australia in 2017–2018, private hospitals provided 95% of rehabilitation episodes of care for gonarthrosis (arthrosis of the knee) and 94% for coxarthrosis (arthrosis of the hip) (Australian Institute of Health and Welfare, 2019a). We suspect these admissions are for care post arthroplasty, although there may also be some admissions for other reasons to do with the patients' arthritic conditions.

When investigating regional differences, individuals in Victoria were reported to be significantly more likely to be discharged to inpatient rehabilitation following both THA ($p = 0.001$) and TKA ($p < 0.001$), despite Victoria having a small number of rehabilitation admissions per 1,000 population (Australian Institute of Health and Welfare, 2019a). These regional differences are important, despite no significant difference being found in our study between discharge destination from private and public hospitals ($p = 0.055$). The over-representation of Victorian hospitals in our data may influence this result as this state has an increased use of inpatient rehabilitation as a discharge destination following TJA for both public and private patients.

Weekend physiotherapy service was reported by physiotherapists as being provided by the majority of hospitals (96.8%) in Australia and New Zealand for patients undergoing TJA. The provision of a weekend physiotherapy service has demonstrated increased functional mobility and a reduced need for inpatient rehabilitation following TJA (Haas et al., 2018). However, the

effects of a weekend service on LOS vary in the literature (Haas et al., 2018; Pengas et al., 2015). Public hospitals were more likely to provide a reduced/priority weekend service (59.3% vs 29.5%, $p = 0.01$), whereas the private hospitals were more likely to provide a business hours service (59% vs 28.4%, $p = 0.001$). Although there is research to support weekend physiotherapy, further research around benefits and cost of different models of service is required.

Mobilisation on POD0 following TJA has been suggested to reduce hospital LOS for some individuals without increasing adverse outcome (Gwynne-Jones et al., 2017; Tayrose et al., 2013). Despite this, only 53% and 55% of physiotherapists treating THA and TKA, respectively, suggest they would mobilise individuals on POD0. Private hospital physiotherapists suggested they were more likely to mobilise patients POD0 compared to public hospital physiotherapists (THA 68.2% vs 44.4%, $p = 0.011$ and TKA 70.5% vs 46.9%, $p = 0.011$); however, it is unknown how many actually routinely mobilise their patients on POD0. The most common perceived barriers to early mobilisation from physiotherapists were the medical status of the patient (53.6%), staffing resources (53.6%), and surgeon preference (29.6%). Pre-operative comorbidities measured using the American Society of Anaesthesiologist score have been associated with post-operative medical complications and increased LOS (Kimmel et al., 2011). As individuals undergoing TJA in the private sector have less comorbidities than those in the public sector (Naylor et al., 2019), this may have an impact on their medical status immediately post-operatively and thus their ability to mobilise safely on POD0.

In terms of post-operative orders or restrictions, variations still exist. For example, despite mounting evidence suggesting that removal of routine hip precautions after primary THA via posterior or anterolateral approach is safe (Dietz et al., 2019; Tetreault et al., 2020), 88% of respondents reported either standard or modified hip precautions as routine for this population. For sites where THA via an anterior approach was completed (62.4%), there was no consensus regarding use of routine precautions or restrictions. Where precautions were used, there was heterogeneity in the directions of movement restricted (Appendix C). The risk of dislocation following primary THA is multifactorial and reportedly associated with surgery-, patient-, and implant-related factors (Kunutsor et al., 2019). Rather than using a 'one-size-fits-all' approach to precautions following THA, research suggests it may be useful to target modifiable patient factors pre-operatively and consider use of specific movement restrictions post-operatively based on intraoperative findings and the individual patient (Kunutsor et al., 2019).

Study limitations

Limitations include the high proportion of responses from two states (Victoria and New South Wales) and the need to pool data from smaller states in order to ensure they were de-identifiable. While it has been reported that paper-based surveys elicit greater response rates from allied health professionals than online surveys (Kidd et al., 2019), the time and monetary cost involved in distributing paper-based surveys was prohibitive for this project. An additional limitation is that while physiotherapists were asked to report how their institutions manage patients undergoing TJA, we did not collect objective measures against which to compare these assumptions.

CONCLUSION

Heterogeneity of care across the private and public healthcare sectors is described by physiotherapists for individuals undergoing elective TJA in Australia and New Zealand. Opportunities to research optimal management of individuals following TJA remain, particularly in regard to discharge destination, LOS, timing of first mobility, and criterion for discharge. Opportunity also exists to survey surgeons to document variances in surgeon preferences for pre- and post-operative care. Development of evidence-based clinical practice guidelines by an expert, multidisciplinary team may assist in reducing unwarranted variations and reducing the gap between evidence based and actual practice.

KEY POINTS

1. Heterogeneity in patient care following total joint arthroplasty (TJA) is reported by physiotherapists in public and private hospitals and across different regions in Australia and New Zealand.
2. Physiotherapists in private hospitals reported a longer length of stay, are more likely to mobilise their patients post-operatively on day 0, and are more likely to offer a 7-day compared to 5-day physiotherapy service for patients following TJA.
3. Variation in post-operative management was reported in relation to precautions and early mobilisation.
4. Opportunity exists to develop clinical practice guidelines for the management of individuals receiving TJA to decrease unwarranted variations in care.

DISCLOSURES

No funding was received for this research. There are no conflicts of interest that may be perceived to interfere with or bias this study.

PERMISSIONS

Ethical approval was obtained from the Alfred Hospital Ethics Committee (project number 365/19). Participants indicated consent to participate by completion of the survey.

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Appendix A

DISCHARGE CRITERIA FOR PATIENTS WITH TOTAL HIP ARTHROPLASTY (*N* = 125)

Criteria	Total		Private hospital		Public hospital		*p*
	n	%	*n*	%	*n*	%	
Range of movement goal							
Yes	6	4.8	2	4.5	4	4.9	1.000
No	119	95.2	42	95.5	77	95.1	
No quadriceps lag							
Yes	6	4.8	3	6.8	3	3.7	0.664
No	119	95.2	41	93.2	78	96.3	
Independent with home exercise programme							
Yes	50	40.0	23	52.3	27	33.3	0.039
No	75	60.0	21	47.7	54	66.7	
Independent with personal activities of daily living							
Yes	72	57.6	25	56.8	47	58.0	0.896
No	53	42.4	19	43.2	34	42.0	
Independent with mobility							
Yes	124	99.2	43	97.7	81	100	0.352
No	1	0.8	1	2.3	0	0	
Independent with transfers							
Yes	116	92.8	41	93.2	75	96.2	1.000
No	9	7.2	3	6.8	6	7.3	

Appendix B

DISCHARGE CRITERIA FOR PATIENTS WITH TOTAL KNEE ARTHROPLASTY (*N* = 125)

Criteria	Total		Private hospital		Public hospital		*p*
	n	%	*n*	%	*n*	%	
Range of movement goal							
Yes	77	61.6	22	50.0	55	67.9	0.049
No	48	38.4	22	50.0	26	32.1	
No quadriceps lag							
Yes	18	14.4	6	13.6	12	14.8	0.858
No	107	85.6	38	86.4	69	85.2	
Independent with home exercise programme							
Yes	55	44.0	25	56.8	30	37.0	0.033
No	70	56.0	19	43.2	51	63.0	
Independent with personal activities of daily living							
Yes	72	57.6	25	56.8	47	58.0	0.896
No	53	42.4	19	43.2	34	42.0	
Independent with mobility							
Yes	124	99.2	43	97.7	81	100	0.352
No	1	0.8	1	2.3	0	0	
Independent with transfers							
Yes	118	94.4	42	95.5	76	93.8	1.000
No	7	5.6	2	4.5	5	6.2	

Appendix C

DIRECTION OF RESTRICTIONS FOR HOSPITALS WITH PRECAUTIONS FOLLOWING ANTERIOR APPROACH (*N* = 55)

Direction	*n*	% [a]
Flexion	7	12.7
Extension	42	76.4
Abduction	8	14.5
Adduction	11	20.0
Internal rotation	6	10.9
External rotation	27	49.1
Straight leg raise	3	5.5
Pivot/twist on operated leg	5	14.5

[a] Percentage ≠ 100 as some sites reported multiple directions of movement restriction.