

ARTICLE



Developing spinal cord injury physiotherapy clinical practice guidelines: a qualitative study to determine how physiotherapists and people living with spinal cord injury use evidence

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STUDY DESIGN: Generic qualitative design.

OBJECTIVES: Australian and New Zealand SCI physiotherapists are developing clinical practice guidelines for the physiotherapy management of people living with spinal cord injury. To guide the development of the guidelines it was important to understand how physiotherapists and people living with spinal cord injury use evidence to choose interventions and the potential barriers and facilitators to the uptake of the clinical practice guidelines.

SETTING: Spinal Cord Injury Centres in Sydney, Australia and New Zealand.

METHODS: Focus groups and interviews with physiotherapists and people living with spinal cord injury were recorded, transcribed, and subjected to thematic analysis.

RESULTS: A total of 75 participants took part in the study, 45 physiotherapists and 30 people living with spinal cord injury. Three main themes were identified from the data: (1) Types and sources of evidence that influence treatment choices, (2) the many factors determining treatment choices, and (3) ways in which clinical practice guidelines could influence treatment.

CONCLUSIONS: Clinical practice guidelines have the potential to reduce the barriers identified by physiotherapists in accessing and interpreting research evidence on interventions for people living with spinal cord injury. Supported implementation of guidelines is required to demonstrate their benefit and encourage physiotherapists to factor in evidence when balancing the multiple factors influencing choice of physiotherapy intervention.

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INTRODUCTION


Physiotherapy is an integral part of the rehabilitation of people living with SCI (PLwSCI) and crosses an extensive scope of practice and specialty [1]. There are various physiotherapy interventions available to PLwSCI [1]. A recent mapping review published in *Spinal Cord* identified over 450 randomised controlled trials involving PLwSCI. Nine of the top ten topic areas were relevant to physiotherapists, with an estimated 300 plus randomised controlled trials relevant to physiotherapy practice [2]. However, surprisingly few high-quality and conclusive randomised controlled trials support the effectiveness of physiotherapy interventions [3].

Physiotherapists are often conflicted when deciding on treatments knowing the treatments they provide, or patients request, are not always supported by high-quality evidence [3]. Even when research evidence is available, many physiotherapists report lacking the skills needed to interpret the evidence [4–6]. The

increased access to unregulated information available through the internet and social media sites [7] may give PLwSCI expectations about treatments that physiotherapists also need to take into consideration.

Clinical practice guidelines (CPGs) are widely accepted as providing a summary of research that can be implemented in clinical settings [8]. CPGs have been identified as facilitating physiotherapists' use of research in clinical practice [9]. While there are already a range of CPGs for SCI [10–12], few are physiotherapy specific [3], and many do not include the physiotherapy interventions commonly provided to PLwSCI [3]. Therefore, specific physiotherapy CPGs, which summarise and interpret evidence from the existing trials and make clear recommendations based on the best available evidence are needed. When there is insufficient evidence about a treatment, then a recommendation for or against a treatment is based on a consensus opinion of a group of experts. The consensus opinion

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provides clinicians with clear guidance in the absence of evidence.

Australian and New Zealand SCI physiotherapists are developing CPGs for the physiotherapy management of PLwSCI. This is a 3-year project funded by four different organisations. As a first step to the development of these CPGs, we set out to better understand how physiotherapists and PLwSCI use evidence and potential barriers and facilitators to the future rollout and uptake of our CPGs.

METHODS

A study with a generic qualitative design within a paradigmatic framework of interpretivism and constructivism was undertaken based on interviews with physiotherapists and PLwSCI. The project was approved by the Northern Sydney Local Health District Human Research Ethics Committee (2019/ETH00589) and University of Otago Health Ethics Committee (H19/076). Lived experience consultation was provided by the Burwood Academy Consultation Network [13, 14].

Recruitment

Physiotherapists from specialist SCI centres in Sydney, Australia (Prince of Wales Hospital, Royal North Shore Hospital and Royal Rehab), Auckland (Auckland Spinal Rehabilitation Unit) and Christchurch (Burwood Spinal Unit) New Zealand and working in the community across New South Wales, Australia and New Zealand were invited to participate. Physiotherapists were eligible to participate if they had provided physiotherapy (or similar) services to PLwSCI in a hospital or community setting. The experience level of physiotherapists was purposely kept open to ensure breadth.

PLwSCI were invited to participate by physiotherapists or doctors based in hospital or community settings. They were eligible to participate if they had a SCI of any level or severity, and had received physiotherapy services

related to their SCI. Efforts were made to ensure diversity in ages, ethnicity, gender, and level of impairment. Participants were excluded if they had a serious medical condition, cognitive impairment, drug dependency, psychiatric illness, or behavioural problems, or did not speak English sufficiently well to provide informed consent.

Data collection. A pragmatic approach to data collection was used to accommodate the range of participants, maximise participation, and accommodate restrictions imposed as a result of the COVID-19 pandemic. Information was collected through interviews and focus groups either in person (face to face), by telephone or virtually (via Zoom™) (Table 1).

Two interview schedules of semi-structured questions were developed by LH and JG to address the aims of the study in consultation with an independent commercial organisation experienced in qualitative research. One schedule was developed for physiotherapists and the other for PLwSCI, with the same issues raised in both focus groups and interviews. These were then reviewed by the wider research team and by PLwSCI (via The Burwood Academy Consultation network). Example questions are shown in Table 2.

The interviews and focus groups in Australia were conducted by an independent commercial organisation experienced in qualitative research, and in New Zealand by JN, JD and VS. All sessions were audio recorded and transcribed verbatim. NVivo 12 software was used to store and manage data.

Data analysis. A thematic analysis of the data was used following the six-step process suggested by Braun and Clarke [15]. Inductive coding was performed by separate coders in Australia and NZ. Codes and relevant data were collated in an iterative process of returning to the original data. Secondary coding was conducted by two authors (VS and JD) to check for consistency. The initial themes were established by JN that reflected the

Table 1. Data collection methods.

Participants	Country	Focus groups <i>N</i> (no. of participants)		Interviews <i>N</i> (no. of participants)		Total <i>N</i> (no. of participants)
		in person	Zoom	in person	Zoom/phone	
Physiotherapists	Australia	3 (15)	1 (2)			4 (17)
	New Zealand	2 (19) (spinal unit)	2 (9) (community)			4 (28)
People living with SCI	Australia			12 (12) (in-patients)	8 (8) (community)	20 (20)
	New Zealand	2 (7) (in patients)			3 (3) (community)	5 (10)
						33 (75)

Table 2. Example interview questions.

People living with SCI (PLwSCI)
1. Why do people with SCI ask for certain types of therapies?
2. What sort of therapies do PLwSCI want and why?
3. On what basis do PLwSCI decide on the types of therapies they are happy to receive/participate in?
4. How important is it to PLwSCI to know that a therapy has a good evidence base?
5. How much time/effort are PLwSCI willing to devote to therapies?
6. What sorts of benefits do PLwSCI expect/want to see in return for spending time doing therapy?
7. How satisfied are PLwSCI with the therapies they have received to date? If so why, and if not, why not?
8. Where do PLwSCI get information about the types of therapies that are best for them?
9. How useful do PLwSCI believe evidence-based guidelines for treatments would be?
10. How likely are PLwSCI to accept evidence-based guidelines for treatments, and if not, why not (and vice versa)?
Physiotherapists
1. Why do physiotherapists administer certain types of therapies, particularly if there is little evidence to support decisions?
2. How much are physiotherapists' decisions guided by what people with PLwSCI want? And how important a consideration should this be?
3. How much benefit do physiotherapists need to see from a therapy to justify its use?
4. What sorts of therapies do physiotherapists currently provide that may not be justified on current evidence?
5. What sorts of therapies don't physiotherapists provide, that they believe they should provide?
6. How likely are physiotherapists to follow evidence-based guidelines for treatments, and if not, why not (and vice versa)?

data from all participants across both countries. These were refined collaboratively with authors from Australia and NZ (VS, JD, JG and LH).

RESULTS

A total of 75 participants took part in the study: 45 physiotherapists and 30 PLwSCI. Physiotherapists were predominantly female with a range of experience. PLwSCI had sustained their injuries between 2 months and 16 years prior and had received physiotherapy in a range of settings. They were predominantly male, with a range of impairment levels (Table 3).

Focus groups were conducted separately for the physiotherapists (8 focus groups) and PLwSCI (2 focus groups). Focus groups lasted between 40 and 90 min. Twenty-three interviews with PLwSCI were performed which lasted between 20 and 60 min (Table 4). Separate schedules were developed for physiotherapists and PLwSCI, with the same issues raised in both focus groups and interviews.

Three themes were identified: (1) Types and sources of evidence that influence treatment choices, (2) The many factors that influence treatment choices, and (3) Ways in which CPGs could influence treatment choices. Themes 1 and 2 describe factors that influence how physiotherapy interventions are selected. Theme 3 describes specific facilitators and barriers to physiotherapy specific CPGs for SCI rehabilitation. The overall themes are described in Table 4 with illustrative quotes provided for each theme in Figs. 1–3.

Theme 1: Types and sources of evidence that influence treatment choice's

Both physiotherapists and PLwSCI talked about how evidence influenced their treatment choice. In both groups, evidence was broad ranging and not necessarily considered just research evidence. The physiotherapists explained the diverse and complex presentation of SCI meant sample sizes in research were often too small to provide conclusive results. They also

expressed concern about the methodology and potential for bias in studies. They believed that many common interventions used in their practices were not backed by strong scientific evidence. Consequently, they relied heavily on their clinical expertise when making treatment decisions. Physiotherapists who had worked in the SCI units for some time felt they had gained specialist or 'expert' knowledge in providing SCI treatment, which gave them more confidence in using clinical experience to justify a treatment option.

Most physiotherapists identified peers with equal or greater experience, as their first source of evidence. Peers were perceived as a source of clinical and research evidence or were relied upon to direct them to appropriate research evidence. Community physiotherapists in NZ described SCI unit physiotherapists as 'experts' and perceived them to be more up to date with the research evidence. However, they were considered difficult to access for those external to the SCI centre. Community physiotherapists also described uncertainty knowing where to look for evidence and a lack of access to databases that enabled article retrieval.

When asked about looking for 'evidence' to support treatment choices, most physiotherapists acknowledged they didn't routinely search for the latest research evidence, but relied on research they had accessed previously (sometimes many years earlier). Most physiotherapists indicated they only looked for the latest evidence for treatments they were not familiar with, or when treatments were not working. When searching for evidence online, Google Scholar was often a primary source of information, especially for physiotherapists with limited access to academic databases or for those that didn't know where else to look. Other sources of evidence included collated information such as SCIRE (SCI Rehabilitation Evidence <https://scireproject.com/>), PEDro (www.pedro.org.au), conferences, company representatives and members of the multi-disciplinary team.

PLwSCI reported multiple sources for obtaining evidence about physiotherapy treatments. The most frequently

Table 3. Characteristics of the physiotherapist and PLwSCI participants.

	Physiotherapist participants		PLwSCI participants	
	NZ (n = 28)	AU (n = 17)	NZ (n = 10)	AU (n = 20)
Sex				
Male/female	4/24	2/15	8/2	14/6
Years of SCI physiotherapy experience				
<1 year	5	0	–	–
1–5	13	4	–	–
6–10	5	6	–	–
11–15	3	3	–	–
>15	2	4	–	–
Workplace				
Inpatient/Community	16/12	9/8	–	–
ASIA ^a Impairment Scale				
C1–4 AIS A, B or C	–	–	1	3
C5–8 AIS A, B or C	–	–	4	5
T1–S5 AIS A, B or C	–	–	–	3
AIS D any injury level	–	–	5	9
Time post injury				
<1 year	–	–	7	4
1–5	–	–	–	13
6–10	–	–	1	2
11–15	–	–	2	1

^aAmerican Spinal injuries Association.

Table 4. The three themes with the key ideas from physiotherapists and people living with SCI (PLwSCI) summarised.

Themes	Participants	
	Physiotherapists	People living with SCI (PLwSCI)
Types and sources of evidence that influence treatment choices	<ul style="list-style-type: none"> - Personal clinical expertise - Physiotherapy peers - Published research - Broad evidence such as Google Scholar 	<ul style="list-style-type: none"> - Physiotherapists or doctors - Resources on the internet including peer-based sites - Friends and family - Peers living with SCI
The many factors that influence treatment choices	<ul style="list-style-type: none"> - Evidence from wide range of sources - Clinical expertise - Patient goals - External factors such as funding, availability of equipment, treatment location (hospital or community), staffing levels, time available for treatment or length of stay - Personal and injury characteristics such as age, level of injury, and comorbidities 	<ul style="list-style-type: none"> - Personal goals - Physiotherapists' opinions - External factors such as funding
Ways in which clinical practice guidelines could influence treatment choices		
Usefulness	<ul style="list-style-type: none"> - Most likely for students, those less experienced 	<ul style="list-style-type: none"> - Most likely for less experienced staff - Provides accountability, safety - Concerns may restrict treatments options
Willingness to adopt	<ul style="list-style-type: none"> - Variable willingness, especially if recommendations contradict current views - Need to have agency for therapists to make own clinical judgement 	
Operationalisation	<ul style="list-style-type: none"> - Want evidence available as part of CPGs - Need to reflect complexities of SCI - Could limit treatment options 	
Deliverability	<ul style="list-style-type: none"> - Need to be freely accessible - Need to be updated regularly - Need to be advertised and promoted widely 	<ul style="list-style-type: none"> - Need to be advertised and promoted widely

Types and sources of evidence that influence treatment choices	
Physiotherapists	People living with SCI (PLwSCI)
<p>"A lot of what we do is unsure with the evidence. Stretching is the perfect example. There's been a lot of studies done and it's a bit unclear, but we do a lot of stretching and positioning." (Physiotherapist)</p> <p>"I guess I wouldn't know where to start (looking for evidence), to be honest, what would be useful and what wouldn't, because we first go to seniors with more experience for where to start at the moment. That's the first port of call, I think." (Community Physiotherapist)</p> <p>"I think it can be an article that we've read or something that we've seen on SCIRE (SCI Rehabilitation Evidence). Often, we're using it to support our viewpoint, to give, you know, a realistic opinion to the patient." (Physiotherapist Spinal Unit)</p>	<p>"I trusted the professional, which was not the best thing. I think (you must also) learn to trust yourself." (PLwSCI)</p> <p>"Well, I would look online and see YouTube videos of how to do things. Most of the time it will be practical things, like getting on an airplane." (PLwSCI)</p> <p>"I just kind of try laying off that stuff (searching for information online) because you fill your head with, like, false information and then we'll go down the rabbit hole – a rabbit hole that will never end." (PLwSCI)</p>

Fig. 1 Theme 1 Quotes from physiotherapists and people living with spinal cord injury (PLwSCI).

The many factors that influence treatment choices	
Physiotherapists	People living with SCI (PLwSCI)
<p>“A majority of the work is through funding bodies. All of it I have to get pre-approval for, and that’s a really good thing because you have to say to (people with SCI), “Look, I’ve got to justify why they’ve got to pay me all this money.” Therefore, (treatments) have got to have goals and it’s got to be a measurable type of thing... It means you’re always objective, you’re always like, “Is this reasonable? Is this necessary? Does it have that kind of cost benefit ratio?” (Physiotherapist)</p> <p>“I mean, if there’s specific research around, like their potential rehab, or whatever it happens to be, then you can always obviously say, ‘Look, research has shown that if we do x, y, z, then this, you know, would bode well for you.’ You can always use that, or you can use your previous experience as well to help justify it.” (Community Physiotherapist)</p> <p>“Sometimes if the setting is safe, I’ve tried treatment options with people, you know, if I know that nothing really bad’s gonna happen, I’ve given stuff a go that they really wanted to, even though I might know clinically and from research, that it’s probably not the best thing to do, but it helps them go through their process of their rehab of what they can and can’t do.” (Community Physiotherapist)</p> <p>“(passive) standing doesn’t have great evidence for it, but...some people just really enjoy being upright... It’s something that they’re willing to do.” (Physiotherapist)</p>	<p>“Because of my initial experience with my physiotherapist when I was in rehab—she was saying that the evidence says I could not ever transfer, which I eventually did do. So, I am sceptical about evidence... I prefer my physiotherapist to be goal orientated rather than based on my level of injury.” (PLwSCI)</p> <p>“I’m prepared if like, yeah, if the physios had come to me and said, ‘We wanna try this,’ I’d say, ‘Go for it’ (PLwSCI Community)</p> <p>“Anything that I’ve asked for that is specific to my recovery they go out of their way to make sure I get it.” (PLwSCI)</p>

Fig. 2 Theme 2 Quotes from physiotherapists and people living with spinal cord injury (PLwSCI).

mentioned sources (from most to least) were clinicians (physiotherapists, medical staff), the internet (including peer-based sites), friends and family, and other PLwSCI. While receiving inpatient treatments, PLwSCI were more likely to rely on their clinical team, particularly their physiotherapists, for information. PLwSCI living in the community relied more on the internet and advice from other PLwSCI. This aligned with the observations of the physiotherapists.

PLwSCI described accessing specific websites they felt were useful for learning about exercises and recovery, including muscle growth and nerve regeneration. Websites were considered more credible if they were affiliated with a university, new research, or had an extensive resource library e.g., Spinal Cord Injuries Australia, the Mayo Clinic, and Project Edge. PLwSCI most commonly accessed social media sites, such as chat forums or closed Facebook groups, run by or heavily featuring PLwSCI. These were described as easily accessible and providing useful information about post injury life with a community feeling. However, for some the information could be a bit overwhelming.

Physiotherapists acknowledged the value of online sites with PLwSCI sharing their experiences, and some reported directing

PLwSCI to these sources. However, physiotherapists had reservations as to whether PLwSCI could fully appreciate that treatments effective and suitable for one type of SCI may not be suitable for them.

Theme 2: The many factors that influence treatment choices

Most physiotherapists stated that ‘evidence’ was not the only consideration in clinical decision making. They agreed that evidence was important but they felt that evidence often failed to reflect the complexity of SCI and the limitations of clinical practice. They expressed differing opinions on the level of evidence needed to support a treatment. When treatments lacked evidence, both physiotherapists and PLwSCI were willing to try the treatments especially if there was any suggestion that that they could improve psychological wellbeing or facilitate recovery, provided there was assurance that the treatments were safe. Physiotherapists described using a complex process of weighing up evidence, clinical expertise, patient goals, and other external factors to select and plan for treatment. External factors included practical considerations such as funding, availability of equipment, treatment location (hospital or community), staffing levels, and time available for treatment or

Ways in which clinical practice guidelines COULD influence treatment choices	
Physiotherapists	People living with SCI (PLwSCI)
<p>“They’re (CPG) your first ‘go to’ point as to how to adapt the treatment to the context. Whether it’s community, whether it’s out-patients, whether it’s inpatient, acute rehab – it gives us something to guide best practice in the relevant context.” (Physiotherapist)</p> <p>“It would be good if they sort of fostered consistency and continuity sort of amongst, you know, across the board, ... to sort of, you know, promote consistency, continuity, so there’s a bit of, you know, equitable distribution of services and, and also being able to take that to a funder and say, ‘You know, these are guidelines that have been developed and could be a rationale for providing treatment therapy.’” (Physiotherapist)</p> <p>“Something that you could print off and provide as a written piece of information is still really important to back your verbal conversations.” (Physiotherapist)</p> <p>“it’s easy to get set in your ways. So if you do have some guidelines that might prompt you to think a bit wider, like, I know that we do things in terms of peer discussion and utilising the experience of other therapists, but just to keep everyone kind of accountable, ... because maybe you haven’t done it for a while, whereas if you’ve got these guidelines it’ll, you can kind of use it as a bit of a refresher to keep, like keep your toolbox kind of like up to date.” (Physiotherapist)</p>	<p>“Because of my initial experience with my physiotherapist when I was in rehab—she was saying that the evidence says I could not ever transfer, which I eventually did do. So, I am skeptical about evidence... I prefer my physiotherapist to be goal orientated rather than based on my level of injury.” (PLwSCI)</p> <p>“Just to know what works, and to know if my physiotherapist is doing the right thing and doing what works. ...that’s a huge help to the consumer I would say.” (PLwSCI)</p> <p>“I think you kind of want to drive decisions yourself a bit, but you want to make sure that you are making ones that make sense through using the Guidelines and talking to your therapist about it. I think that’s the way to go.” (PLwSCI)</p> <p>“It would be interesting to know what research is actually out there that would be useful to me, to fire these, you know, fire my hands back, like as they tell me, it’s in the hands of mother nature.” (PLwSCI)</p> <p>“If the Guideline said something, and I didn’t want to spend time to do that, then I would ask the physiotherapist to justify it and convince me. If I saw that it could help me then I would do it, but if I couldn’t be convinced then I would spend the time doing what I want to do.” (Inpatient)</p> <p>“I think it would be difficult to come up with a very concise set of guidelines, just due to the nature of spinal cord injuries being so different from one patient to another ...” (PLwSCI)</p>

Fig. 3 Theme 3 Quotes from physiotherapists and people living with spinal cord injury (PLwSCI).

length of stay. In addition, personal and injury characteristics such as age, level of injury, and comorbidities were considered. While all physiotherapists agreed evidence was important, they felt that evidence often failed to reflect the complexity of SCI and the limitations of clinical practice. For most physiotherapists interviewed, ‘evidence’ was not the only consideration in clinical decision making.

In some instances, decisions over treatment choice were perceived as a negotiation or compromise, in which physiotherapists would explain treatment options and then PLwSCI would have the final say.

Physiotherapists observed that PLwSCI generally accepted their advice particularly during their initial inpatient stay. PLwSCI paid particular attention when advised not to use a certain treatment although the physiotherapists noted that some PLwSCI would get frustrated if the physiotherapists did not provide a treatment that the PLwSCI believed would benefit them. Some PLwSCI would seek these treatments elsewhere. A small number of PLwSCI spoke of questioning their physiotherapists’ recommendations or pushing for a particular treatment. For many, the turning point of control in decision-making came once they were in the

community, having learnt more about themselves, their injuries and feeling more confident in voicing their opinions. All acknowledged that funding was a barrier to accessing more treatment options.

Theme 3: Ways in which clinical practice guidelines could influence treatment choices

Overall physiotherapists welcomed the development of the SCI Physiotherapy CPGs, but listed substantial expectations about what CPGs should deliver. They felt CPGs should summarise effectiveness of treatments, contain practical information and recommend treatments compatible with current practice expertise. They suggested the CPGs be digestible and brief, but also wanted clear, comprehensive information that was accessible and easy to navigate, but catered to different experience and knowledge levels.

Usefulness. Physiotherapists perceived the CPGs would be most useful for student physiotherapists and, those with less experience or who treated few PLwSCI. The CPGs were considered potentially useful for deciding the appropriateness of treatments outside

usual practice, to support equipment funding applications, to use as a discussion point with PLwSCI, or to justify treatment options. They were also seen as a way of improving equity across services and funding streams.

PLwSCI living in the community perceived CPGs as being useful for guiding generalist physiotherapists who may not be specifically trained or experienced in SCI. Some also saw CPGs as a form of accountability, ensuring that a PLwSCI received best practice physiotherapy and safe treatment thereby avoiding risky or costly treatments.

Several PLwSCI raised concerns that CPGs could reinforce treatments based on a person's classification of neurological/impairment level, which they felt could be horizon-limiting for people during recovery. Many PLwSCI did not want treatments to be limited by current evidence. A small number felt anecdotal evidence and the benefits of a positive mind-set for treatments could outweigh evidence. Many PLwSCI voiced a willingness to try anything if it could help them stand one day.

Willingness to adopt. Despite positive responses to the development of CPGs in principle, physiotherapists expressed different willingness to adopt them. Physiotherapists with more SCI experience and those working in SCI centres anticipated the CPGs would reflect their views about treatments. However, if contradicted, they admitted they may find the CPG recommendations difficult to adopt. Many hoped CPGs would not be imposed on them, rather they would still have professional agency to make their own clinical judgements.

Operationalisation of CPGs. Physiotherapists questioned how the CPGs would be operationalised. For example, there was a desire for the actual evidence to be made available to confirm the rigour behind the recommendations. They were curious how the recommendations would reflect the complexity of SCI and how a lack of evidence would be addressed. Some physiotherapists expressed concern that CPGs may reduce the range of treatment options if there was limited evidence available about current treatments. The idea of a separate CPG for PLwSCI was considered useful but physiotherapists expressed doubts that a standalone PLwSCI specific CPG would be sufficient, believing that a PLwSCI would still need a physiotherapist's guidance to interpret the information.

Deliverability of CPGs. Physiotherapists recommended CPGs be freely accessible in different formats (e.g., online resource, hard copy). It was important to all participants that CPGs were regularly updated to maintain their relevance and usefulness. Both groups felt the CPGs needed to be advertised in multiple ways including promotion through funding organisations, mentors for physiotherapists in rural communities, support coordinators, conference presentations, and by the Australian and New Zealand physiotherapy professional organisations. Some recommended the CPGs be embedded across university curricula to encourage awareness in early-career physiotherapists. This would involve working together with key academics to design and develop approaches to embed CPGs into undergraduate and postgraduate programmes.

DISCUSSION

The first aim of this study was to understand what factors influence how physiotherapy interventions for PLwSCI are selected and the role of evidence in decision making. The results show that although physiotherapists currently use evidence to make treatment decisions, it is only one part of a complex balance of many factors [16]. Physiotherapists in this study identified difficulties incorporating evidence in their practice. Organisational barriers to using evidence were identified as reported previously. Many found journal articles difficult to find, to understand or to relate to their own clinical practice [9, 17, 18]. Community-based physiotherapists in particular reported a lack of access to expert

peer support and felt that their isolation limited their abilities to implement research into their practice [6, 9, 19, 20]. Because of these difficulties many physiotherapists relied on dated literature accumulated over their working career, or quick Google or Google Scholar searches. Consequently, there is a risk that physiotherapists are not keeping up to date with the evidence. CPGs could reduce these barriers if they provide a concise synthesis and interpretation of the current available research on a treatment intervention, which could guide a decision about whether to choose a treatment.

Although it was anticipated that physiotherapists and PLwSCI would have different knowledge requirements of CPGs, this research also illustrated distinct requirements between hospital and community settings. Our findings indicate that physiotherapists working within the SCI centres were more likely to prioritise clinical experience and were more likely to seek guidance from peers than use evidence [9].

Community physiotherapists not linked to a hospital or spinal injury service potentially face additional challenges when deciding on treatment options. They have reduced access to expert peers and research evidence, and the PLwSCI they work with are likely to have increased expectations and more confidence to articulate their views. As a result, community physiotherapists might have greater incentive to use CPGs to help with decisions making [4].

PLwSCI identified their physiotherapists as their main source of evidence to justify physiotherapy interventions while in hospital, and generally, did not question treatment choices during their early rehabilitation. Once in the community, PLwSCI gained confidence in making decisions, and began to look for information themselves and explore intervention choices. PLwSCI were more likely to use information from peers or online peer-based information, than look for scientific evidence. They wanted to try new interventions irrespective of the evidence provided they would not cause harm. This attitude was acknowledged by the physiotherapists but did also have the potential to cause internal conflict for the physiotherapists striving to ensure the treatment they provided were evidence based. Both the physiotherapists and PLwSCI felt that having information on best practice in a CPG would be reassuring and provide support for physiotherapists, particularly those with less SCI experience.

The second aim of this study was to understand facilitators and barriers to using physiotherapy CPGs for SCI. Although all participants were in favour of CPGs, physiotherapists working in the SCI units felt they were less likely to need to refer to the CPGs because of their experience and expertise. They accepted CPGs were likely to become part of policy and practice because of the systems, procedures and accountability within the SCI centres or hospital setting. There was a perception that using CPGs may inhibit physiotherapists using their professional judgement and could even reduce the range of treatment options if there were limitations on the evidence available. This is similar to findings exploring CPGs use in the stroke population [17]. However, the CPGs may provide an easy resource to access up to date evidence for newer treatment options.

Community physiotherapists appeared more likely to refer to the CPGs as part of their professional practice, especially if they had limited expertise in SCI management. However, they identified specific barriers to implementing the CPGs in a community setting. The biggest perceived barrier to organisations providing community care implementing the CPGs was funding restrictions which dictate the number and type of treatments that can be prescribed. Other constraints included staffing levels and access to equipment, especially when working with people in their own homes.

This study illustrates the benefits of early stakeholder consultation. Through this process we have developed an appreciation of the requirements of CPGs before they are developed. Careful consideration needs to be given to the implementation phase, as our results

indicate that we may encounter some resistance to adopting the CPGs into clinical practice. Some strategies to help overcome barriers to the use of CPG include education, the inclusion of all stakeholders during the development of the CPG, the use of clinical champions in workplaces and the widespread embedding of the CPG into university curriculums [9, 17, 18, 21]. Evidence indicates that education [22], opinion leaders [23] and to a lesser degree printed material [24] are more effective than nothing at changing clinical practice. Combining these strategies has been shown to be effective at increasing adherence to clinical guidelines in a SCI setting [25]. Such strategies will be needed to convince physiotherapists of the benefits of the CPGs and to encourage them to use the CPG to make clinical decisions. Any implementation strategy will need to be tailored [26] differently for community and hospital-based physiotherapists as well as for PLwSCI, considering the barriers to implementation identified in this study. For example, clinical champions can be more readily used in the hospitals than community. In the community it may be necessary to work with the funders of services to help encourage the use of the CPGs.

The design of CPGs has been shown to influence likelihood of implementation [27, 28], and in an environment of rapidly evolving technology, the platforms that CPGs are provided on become increasingly relevant. Our study participants identified the need for the CPGs to be widely accessible and to be available in multiple formats. To maximise uptake, the CPGs will need to be available on a number of platforms, readily accessible, and free to download.

This study is not without its limitations. Importantly, some planned face-to-face interviews needed to be performed over the telephone due to COVID-19 restrictions. The pragmatic approach to data collection and multiple people involved in data collection may be seen as a limitation of the study. In addition, a different set of interviewers were used for Australia and New Zealand, and the coding and themes were independently extracted for the Australian and New Zealand data. However, the inclusion of data from the two countries is a strength of the study because it makes the findings more generalisable.

CONCLUSION

CPGs have the potential to reduce the barriers physiotherapists identified in accessing and interpreting research evidence on interventions for PLwSCI. If CPGs are to be used as a tool in deciding on clinical interventions, supported implementation of CPGs is required to demonstrate their benefit in providing collated evidence and encouraging physiotherapists to factor in evidence when balancing the multiple factors influencing the choice of physiotherapy interventions. Physiotherapists and PLwSCI have high expectations of easily accessible CPGs in a variety of formats that will meet differing information needs for community and inpatient settings while addressing the complexity in presentation of PLwSCI.

DATA AVAILABILITY

The datasets generated and/or analysed during the current study are available from the corresponding author on reasonable request.

REFERENCES

- Harvey LA. Physiotherapy rehabilitation for people with spinal cord injuries. *J Physiother*. 2016;62:4–11.
- McIntyre A, Benton B, Janzen S, Iruthayarajah J, Wiener J, Eng JJ, et al. A mapping review of randomized controlled trials in the spinal cord injury research literature. *Spinal Cord*. 2018;56:725–32.
- Harvey LA, Lin CW, Glinsky JV, De Wolf A. The effectiveness of physical interventions for people with spinal cord injuries: a systematic review. *Spinal Cord*. 2009;47:184–95.
- Grimmer-Somers K, Lekkas P, Nyland L, Young A, Kumar S. Perspectives on research evidence and clinical practice: a survey of Australian physiotherapists. *Physiother Res Int*. 2007;12:147–61.
- Iles R, Davidson M. Evidence based practice: a survey of physiotherapists' current practice. *Physiother Res Int*. 2006;11:93–103.
- Salbach NM, Jaglal SB, Korner-Bitensky N, Rappolt S, Davis D. Practitioner and organizational barriers to evidence-based practice of physical therapists for people with stroke. *Phys Ther*. 2007;87:1284–303.
- Ventola CL. Social media and health care professionals: benefits, risks, and best practices. *P T*. 2014;39:491–520.
- Hill J, Bedford J, Houston D, Reid DA, Baxter GD, Ellis R. Exploring physiotherapists' use of clinical practice guidelines, screening, and stratification tools for people with low back pain in New Zealand. *NZ J Physiother*. 2020;48:59–69.
- Dannapfel P, Peolsson A, Nilsen P. What supports physiotherapists' use of research in clinical practice? A qualitative study in Sweden. *Implement Sci*. 2013;8:31.
- Eng JJ, Teasell R, Miller WC, Wolfe DL, Townson AF, Aubut JA, et al. Spinal cord injury rehabilitation evidence: methods of the SCIRE systematic review. *Top Spinal Cord Inj Rehabil*. 2007;13:1–10.
- Fehlings MG, Tetreault LA, Aarabi B, Anderson P, Arnold PM, Brodke DS, et al. A clinical practice guideline for the management of patients with acute spinal cord injury: recommendations on the type and timing of rehabilitation. *Glob Spine J*. 2017;7:2315–85.
- Guy SD, Mehta S, Casalino A, Cote I, Kras-Dupuis A, Moulin DE, et al. The CanPain SCI clinical practice guidelines for rehabilitation management of neuropathic pain after spinal cord: recommendations for treatment. *Spinal Cord*. 2016;54:514–23.
- Bourke JA. The Burwood Academy consultation committee scoping review. Christchurch: Burwood Academy of Independent Living; 2016.
- Bourke JA, Snell DL, Sinnott KA, Cassidy B. A user-led consultation model: making inclusion of service users in research a reality. *Ethn Inequal Health Soc Care*. 2012;5:61–9.
- Braun V, Clarke V. *Successful qualitative research: a practical guide for beginners*. London: Sage; 2013.
- Vingerhoets C, Hay-Smith J, Graham F. Intersection of the elements of evidence-based practice in interdisciplinary stroke rehabilitation: a qualitative study. *NZ J Physiother*. 2020;48:148–54.
- Donnellan C, Sweetman S, Shelley E. Health professionals' adherence to stroke clinical guidelines: a review of the literature. *Health Policy*. 2013;111:245–63.
- Grimshaw JM, Eccles MP, Lavis JN, Hill SJ, Squires JS. Knowledge translation of research findings. *Implement Sci*. 2012;7:50.
- Francke AL, Smit MC, de Veer AJ, Mistiaen P. Factors influencing the implementation of clinical guidelines for health care professionals: a systematic meta-review. *BMC Med Inf Decis Mak*. 2008;8:38.
- Nilsagård Y, Lohse G. Evidence-based physiotherapy: a survey of knowledge, behaviour, attitudes and prerequisites. *Adv Physiother*. 2010;12:179–86.
- Goetz LL, Nelson AL, Guihan M, Bosshart HT, Harrow JJ, Gerhart KD, et al. Provider adherence to implementation of clinical practice guidelines for neurogenic bowel in adults with spinal cord injury. *J Spinal Cord Med*. 2005; 28:394–406.
- Forsetlund L, O'Brien MA, Forsen L, Reinar LM, Okwen MP, Horsley T, et al. Continuing education meetings and workshops: effects on professional practice and healthcare outcomes. *Cochrane Database Syst Rev*. 2021;9:CD003030.
- Flodgren G, O'Brien MA, Parmelli E, Grimshaw JM. Local opinion leaders: effects on professional practice and healthcare outcomes. *Cochrane Database Syst Rev*. 2019;6:CD000125.
- Giguere A, Zomahoun HTV, Carmichael PH, Uwizeye CB, Legare F, Grimshaw JM, et al. Printed educational materials: effects on professional practice and healthcare outcomes. *Cochrane Database Syst Rev*. 2020;8:CD004398.
- van der Wees PJ, Jantvedt G, Rebbeck T, de Bie RA, Dekker J, Hendriks EJ. Multifaceted strategies may increase implementation of physiotherapy clinical guidelines: a systematic review. *Aust J Physiother*. 2008;54:233–41.
- Baker R, Camosso-Stefinovic J, Gillies C, Shaw EJ, Cheater F, Flottorp S, et al. Tailored interventions to address determinants of practice. *Cochrane Database Syst Rev*. 2015:CD005470.
- Mudge S, Hart A, Murugan S, Kersten P. What influences the implementation of the New Zealand stroke guidelines for physiotherapists and occupational therapists? *Disabil Rehabil*. 2017;39:511–8.
- Reynolds SS, Murray LL, McLennon SM, Ebright PR, Bakas T. Implementation strategies to improve knowledge and adherence to spinal cord injury guidelines. *Rehabil Nurs*. 2018;43:52–61.

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AUTHOR CONTRIBUTIONS

LAH and JVG: initiated and secured the funding for the CPG, designed the study and interview guide, interpreted the results, wrote the report. JLN: NZ data collection, primary analysis of NZ data, synthesis of NZ and Australian data, preparation of first draft of report. JAD and VAS: NZ data collection, secondary analysis of NZ data, wrote the report. AH, MB, LWC, and SD: designed the study, coordinated recruitment, commented on the report.

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COMPETING INTERESTS

The authors declare no competing interests.

ADDITIONAL INFORMATION

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