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**Physical activity promotion for people with spinal cord injury:
Physiotherapists' beliefs and actions**

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Abstract

Purpose: It is vital that people with spinal cord injury (SCI) lead a physically active lifestyle to promote long term health and well-being. Yet within rehabilitation and upon discharge into the community, people with SCI are largely inactive. Physiotherapists are well placed to promote a physically active lifestyle and are valued and trusted messengers of physical activity (PA) by people with SCI. Therefore this study aimed to explore the *perceptions* of physiotherapists in SCI rehabilitation on PA for people with SCI, and *what* is done to promote PA. **Method:** Semi-structured interviews were completed with eighteen neurological physiotherapists (2-22 years experience) from SCI centres in the United Kingdom and Ireland. Framed by interpretivism, an inductive thematic analysis was conducted. **Results:** Three themes were identified: 1) perceived importance of PA; 2) inconsistent PA promotion efforts; and 3) concern regarding community PA. **Conclusions:** This article makes a significant contribution to the literature by identifying that although physiotherapists value PA, active promotion of PA remains largely absent from their practice. To enable physiotherapists to promote and prescribe PA as a structured and integral component of their practice, effective knowledge strategies need designing and implementing at the macro, meso and micro levels of healthcare.

Key words: physical therapy; healthcare; neurological conditions; active lifestyle; knowledge translation; qualitative.

Introduction

Spinal cord injury (SCI) is a devastating neurological condition most commonly caused by a traumatic force damaging the spinal cord and resulting in paralysis. This loss of function and reduced mobility poses a serious risk to the health of people with SCI. For example, secondary health conditions associated with SCI include pressure ulcers, urinary tract infections, chronic pain, obesity, respiratory dysfunction and cardiovascular disorders.[1-3] Additionally these secondary health conditions can increase risk factors for poor mental health, increased disability and a decrease in life expectancy.[3,4] The sudden and significant changes brought about by SCI therefore also present an individual with significant challenges to their well-being.

The concept of well-being generally refers to “optimal psychological function and experience” [5,p.142]. However, there are two distinct perspectives of well-being that reflect differences in what constitutes optimal function and experience. One view, subjective well-being (SWB), refers to an individual’s perceived happiness and satisfaction with life.[5,6] In terms of SWB, SCI can lead to elevated levels of depression and anxiety and decreased self-esteem.[4,7,8] In association with depressive symptoms and SWB, people with SCI have higher comparative risks of feeling helpless, poor quality of life and decreased life satisfaction.[9,10] Psychological well-being (PWB) on the other hand, refers to psychological growth and development.[5,6] Furthermore, in terms of PWB, those with SCI report a loss of purpose in life and increased social isolation and exclusion.[7]

Formal rehabilitation in an SCI centre is the first move towards restoring the health and well-being of a patient with SCI. The role of rehabilitation goes beyond promoting functional independence and aims to return individuals to “the life they want as far as their disability will allow”. [11,p.1164-1165] Thus, a vital part of rehabilitation is to educate people how to take care of a dramatically altered body and teach people to live independently and maintain their health and well-being.[12,13] This includes improving muscle weakness and poor posture, as well as teaching patients essential skills of daily living (ADL), such as floor to chair transfers.[11-13] To continue to improve and maintain health and well-being upon discharge from rehabilitation to the community, and avoid the onset of secondary health conditions, it is vital people lead a physically active lifestyle.[1-3]

Physical activity (PA) has been identified as a means to alleviate or prevent many of the health and well-being complications following SCI. PA in this respect includes leisure time activities such as exercising in the gym, playing recreational sport, and general wheeling.[14,15] Being physically active has been shown to reduce levels of perceived musculoskeletal and neuropathic pain, decrease the risk factors of cardiovascular disease and type 2 diabetes, and lead to greater functional capacity such as ease of transfer thereby improving SWB.[16-18] Moreover, PA can impact SWB through reducing depression, enhancing physical self-concept and increasing life satisfaction,[19,20] and improve PWB through facilitating experiences (such as personal control, responsibility and risk taking) that promote post-traumatic growth.[21]

Yet despite the array of health and well-being benefits to be gained from regular PA, most people with SCI live insufficiently active lifestyles with an estimated 50% completely sedentary.[14] This inactivity is the result of many barriers that constrain PA participation. For instance, following SCI some people perceive they lack the time, energy and motivation to be physically active and therefore PA is not an important consideration in their lives.[20] Conversely, some people who are motivated to be physically active face a lack of knowledge and information about how and where to exercise following SCI.[20] Therefore PA promotion is a significant and timely issue for the SCI community. Importantly, the people (i.e. who) that are deemed credible to convey PA messages and the contexts (i.e. where) in which effective PA promotion might occur, needs to be understood.

A recent focus on PA promotion has identified healthcare professionals as credible messengers for conveying PA messages to people with SCI. Healthcare professionals in rehabilitation are perceived by spinal cord injured patients to be valued, trusted and reliable sources of information.[22,23] Moreover, rehabilitation in SCI centres has been identified as a key context to start promoting a physically active lifestyle and encourage the incorporation of PA into everyday life upon discharge to the community.[22,23] Some consider that the healthcare professionals best placed to promote a physically active lifestyle to people with SCI are physiotherapists (or physical therapists).[23-27] This is because “the roles of physiotherapists as promoters, preventers and rehabilitators puts them in an ideal position to influence exercise behaviours in every individual they treat”.[28,p.11] Moreover, a key responsibility of physiotherapists in the context of rehabilitation is to provide “support for people with disabling conditions to attain independence

and self-determination to be physically active for their long term health”.[12,p.408] Accordingly, the World Confederation of Physical Therapy (WCPT) has hailed physiotherapy as the health-promotion profession. Furthermore they claim “physiotherapists use the health promotion approach of participation and empowerment in their treatment of people and groups to improve their lifestyles and health through physical activity”.[13,p.16]

Despite physiotherapists being identified as key in promoting PA, currently little is known about the PA promotion practices within physiotherapy [27,28] and specifically within SCI rehabilitation. The perceptions physiotherapists hold about PA and SCI, and what they do in terms of promoting PA both in rehabilitation and the community is unknown. These are important empirical questions that have yet to be addressed. A greater understanding of the factors that facilitate or constrain PA promotional practices will enable physiotherapists to play their part in getting people with SCI more physically active.[29] Furthermore, a qualitative investigation will allow for more clarity on *how* these factors influence PA promotion under a variety of circumstances within SCI rehabilitation.[30] Therefore the purpose of this study was to explore the *perceptions* of physiotherapists in SCI rehabilitation on PA for people with SCI, and *what* is done to promote PA.

Methodology and Methods

Qualitative Research and Philosophical Assumptions

Qualitative research can broadly be described as an umbrella term that comprises many small communities of multiple traditions and methods that involve collecting, describing and interpreting data in an inductive manner.[31] More specifically, qualitative research aims to explore the lived experience of others and understand *what it is like* to experience particular events and conditions. A qualitative methodology was drawn for this project as it was most suited to addressing the aim of this research. For example, through collecting textual data (as discussed below), the first author was able to have detailed conversations with the physiotherapists in SCI centres regarding their values and beliefs about PA for their spinal cord injured patients.

Furthermore, qualitative research can also be understood by the underlying paradigmatic assumptions. Adopting a paradigm provides researchers in a certain discipline with a philosophical framework which determines the nature of reality (ontology) and how reality is known to us (epistemology).[31] The philosophical roots of any method of inquiry are important to understand as they challenge the position researchers take as to what should be studied, what counts as knowledge, and how the results are best interpreted.[32] This project was underpinned by interpretivism and framed by ontological relativism (which assumes multiple and subjective realities) and epistemological constructionism (which assumes knowledge is constructed and subjective).[31] Moreover, highlighting the underlying assumptions is imperative to ensure appropriate criteria are drawn upon to judge the quality of the research (addressed below).

Participant Recruitment

Following university ethical approval, a criterion-based purposive sampling strategy [31] was used to recruit physiotherapists currently working within regional SCI centres in the UK and Ireland. To be included in this study, participants needed to be currently working as a neurological physiotherapist within a SCI centre or had left within 6 months of the study. Initial contact was made with participants through an organization for professionals in SCI care in the UK and Ireland (e.g. physiotherapists, occupational therapists, nurses, carers etc.). Despite differences in healthcare systems, the UK and Ireland share similar management approaches to SCI rehabilitation.[33] An information sheet explaining the rationale for the research project and participant requirements was distributed to all members of the organization via email from their secretary. The information sheet ended by asking the respondents, should they be willing to be interviewed, or wish to discuss the project further, to please contact the first author on the email or telephone number provided.

Participants

Seventeen physiotherapists currently working in SCI centres replied to the first author to discuss the research project further and all were invited to interview. One physiotherapist who had recently left employment within an SCI centre (within 6 months) also wished to take part in the study and was invited to interview. Additionally, five physiotherapists in general private practice showed interest in the project but were excluded from the study as they did not meet the

inclusion criteria. The final sample consisted of 18 participants (13 women and 5 men) from regional SCI centres in the UK and Ireland. The participants were aged between 25 – 56 years old and ranged in experience in neurological physiotherapy with 2 – 22 years working in SCI rehabilitation.

Before the start of each interview, the nature of the project was explained again and all ethical procedures were outlined. Participants were invited to ask any questions about the project and informed that they were free to terminate or withdraw from the study at any time without explanation. In an attempt to maintain confidentiality and anonymity, it was made clear that all identifiable information would be removed and pseudonyms would be used in any future publication. That said, it must be acknowledged that unintentional identity disclosure can be magnified in small communities such as rehabilitation centres.[31] Therefore, to avoid *deductive disclosure* [34], a table of participants' characteristics including age, position/rank, and years' experience has not been included. Due to the small number of SCI centres in the UK and Ireland, including this information could make the participants identifiable to their colleagues, patients, friends and family. However, to provide more context to the participants' quotes in the results section, their years' experience has been included alongside the pseudonym.

Data Collection

All of the participants were involved in a semi-structured interview that was between 60-150 minutes in duration. The use of semi-structured interviewing allows for a pre-planned interview guide to direct the discussion, while giving the participants a degree of flexibility in expressing their opinions through open ended questions.[31] The interview questions explored a wide range of subjects, including the role of physiotherapy within SCI rehabilitation, PA within in-patient rehabilitation and PA in the community for this population. For example, we were interested in what PA meant to the physiotherapists in relation to SCI rehabilitation and PA promotion. In this instance we did not provide a definition of PA, rather we asked the physiotherapists for their understanding of PA. We also allowed participants the opportunity to raise any issues regarding SCI rehabilitation and PA that were not included in the interview guide. In addition, after each interview field notes and initial thoughts were written by the interviewer in a reflexive journal. This process allowed any initial concepts raised in previous interviews to be explored in more

detail with the subsequent participants. All interviews took place at a location of the participant's choosing and were digitally recorded and transcribed verbatim.

To enhance rigor, recruitment continued until *data saturation* was achieved.[35] Data saturation – not to be confused with the concept of theoretical saturation in grounded theory – is when no new information is gained through data collection. Theoretical saturation on the other hand is when no new ideas or insights arise in the development of a substantive theoretical model.[31] As data analysis in qualitative research is an iterative and cyclic process that begins alongside data collection (see thematic analysis below), data saturation can be claimed when no new codes or themes are constructed from the data because no new information is arising within the interviews.[35] In this instance, as no new information arose within the last few interviews, no more participants were sought for the study.

Thematic Analysis

A six stage inductive thematic analysis as outlined by Braun et al. [36] was conducted on the interview transcripts. This method was used to identify main patterns in the data without restriction to a pre-existing coding scheme. In the first phase the first author transcribed the interviews as soon as possible after this data was collected, and became immersed within the transcripts by reading them through multiple times and making initial notes on ideas and patterns within the data. The second phase involved generating initial codes from the data which identified key features or points of interest within the transcript. Once data were coded, the third phase of the thematic analysis was to extract the codes and collapse them into potential themes. This stage re-focused the analysis to the broader level of themes and involved combining codes to form overarching patterns within the data. At this stage we identified a collection of candidate themes and sub-themes within the data. This process of generating codes and potential themes was an iterative activity as it began during data collection and ended once all interviews were conducted. New information led to the development of new codes and new themes until data saturation was reached.[35]

The fourth phase involved refinement of these themes as the second and third authors reviewed the entire data set to check if the themes were plausible and formed a coherent and consistent pattern. As Braun et al. [36] explain, this stage is vital to check whether the initial

thematic map ‘accurately’ reflects the meanings in the whole data set. It was during this phase that the subthemes were collapsed leaving the three main overarching themes. Sub themes can be useful for structuring large and complex themes. However, this decision was made as there was not a clear and identifiable distinction between each of the sub-themes when checked against the entire data set. This process of refining the themes is characteristically messy as codes and themes were cross-referenced to the data set and reflexive notes as the “thematic map” was revised multiple times.

During the fifth phase the final refinements were made. This involved defining and refining the themes to identify the essence of each theme, and how they fitted into an overall story in relation to the purpose of the research. At this point, the names of the final themes were altered to more accurately reflect the story each theme was telling regarding the physiotherapists’ perceptions about PA and what they did in relation to promoting PA. These final names were considered to be more succinct and immediately provide the reader with a sense of the crux of each theme.[36] The sixth and final phase involved writing up the report. As Braun et al. [36] explain, it is vital the final analysis provides a concise, logical, coherent, non-repetitive, and interesting account of the story the data tell – across and within themes. With this in mind, the results section includes sufficient evidence of each theme through the use of concise data extracts. Furthermore, the write-up of this research goes beyond description of the data to interpret the data in light of current research on the promotion of PA. The following section on criteria acts to further illustrate the merit and validity of this method and analysis.

Criteria for Judging the Quality of Qualitative Research

In recent years there has been much debate in the literature revolving around the various claims as to what counts as “good quality” qualitative research.[37,38] As different qualitative research methodologies and methods are underpinned by different philosophical assumptions, it is important the criteria drawn upon to judge the quality are appropriate to the form of inquiry undertaken. Such a *relativist* approach means that criteria for judging the quality of qualitative research are drawn from an ongoing list of characterizing traits rather than applied in a universal manner.[31,39] For this study we drew upon a subset of criteria that we deemed appropriate to guide our thematic analysis from the many proposed criteria for judging qualitative

research.[40,41] In turn we propose that any reader may use this guide to make their own judgements about the quality of this study. For example, the worthiness of the topic was illustrated in the rationale for the project by highlighting PA promotion in SCI populations as a relevant, timely and significant issue. Rich rigor was ensured by developing a sample appropriate for the purpose of the study and generating data that could provide for meaningful and significant claims. This study also seeks meaningful coherence which refers to how well the study hangs together in terms of the purpose, methods, and results.[40]

To demonstrate reflexivity and further enhance quality, this study also used an audit trail to document detailed descriptions of the research and decision making process. A colleague acted as a ‘critical friend’ and independently scrutinized the audit trail in terms of both data collection and theoretical matters.[31] Furthermore, participants were also contacted after their interview to offer any subsequent feedback on the interview process and reflections on the initial interpretations of the data. Two participants took the opportunity to share their views and reported that the data resonated with their experiences of SCI rehabilitation. This process is not to be mistaken with member checking which seeks to find the data credible by matching the participants’ and researchers’ interpretations of the data. [41,42] Rather, the fact that the participants were able to connect with the themes and recognize themselves and their colleagues in the data illustrates naturalistic generalizability.[31]

Results

The process of analysis resulted in three themes. These were: 1) perceived importance of physical activity; 2) inconsistent physical activity promotion efforts; and 3) concern regarding community physical activity. Overall these three themes capture a narrative around the physiotherapists’ experiences of PA in SCI rehabilitation. The first theme “perceived importance of physical activity” highlights the vital role PA plays in rehabilitation following SCI, why the physiotherapists believed it was important for their patients to remain physically active and how they came about this knowledge. The second theme “inconsistent physical activity promotion efforts” reflects the reasons why the physiotherapists promoted, or did not promote, PA in SCI rehabilitation. Lastly, the third theme “concern regarding community physical activity” exposes the beliefs and worries as to how people with SCI use PA in the community.

Perceived importance of physical activity

All of the physiotherapists recognised the value that PA played both in SCI rehabilitation and upon discharge to the community. Being physically active was perceived important to improve and maintain health and well-being. For example, in terms of physical health, the physiotherapists drew upon PA in rehabilitation to improve balance, flexibility, strength and cardiovascular fitness with the aim to improve function and independence. These PA opportunities as part of SCI rehabilitation included structured gym sessions with the physiotherapists as well as group exercise and recreational sport activities organised by other health professionals. In some SCI centres these recreational sports activities were occasionally supported by members of a local sport club or organisation. Furthermore they perceived that PA could help in the prevention of secondary health conditions such as weight gain, pressure sores, cardiovascular disease and diabetes in people with SCI. All of these factors were understood by the physiotherapists to positively impact a spinal cord injured person's ability to carry out ADL, improve their independence and ultimately their well-being. In addition, the physiotherapists highlighted factors that impacted upon a person's SWB and PWB. In terms of SWB, the physiotherapists noted that participating in PA was beneficial in improving mood, self-esteem and self-confidence. PWB was also perceived to be improved through PA in terms of patients with SCI having more enthusiasm for life, a sense of purpose and increased social participation. The perceived importance of PA for health and well-being is encapsulated in the following comment from Andrew (4 years' experience):

Physical activity just addresses so many areas of rehabilitation in life. You've got your cardiovascular element of physical activity, getting the heart rate up, as cardiovascular disease is the biggest killer of spinal cord injured people as well as able-bodied people nowadays. Strength that you get from physical activity is insanely important. In inpatient rehabilitation there are a lot of functional and practical skills to learn... But they won't master it until they've got the strength in order to do that technique.

This knowledge that PA was important for health and well-being was predominantly gained through the practical experience of caring for people with SCI over time. With the rare exception of four people who had chosen to take further education (MSc and PhD), the value of

PA was learnt through seeing the perceived detrimental effects of physical inactivity. For example, all physiotherapists had witnessed people with SCI return to the rehabilitation centre months or years after leaving due to illness or secondary health conditions. They also believed this poor health was accompanied with a decrease in their well-being. The physiotherapists perceived that poor health and well-being could have been avoided, and this readmission to the hospital prevented, by people with SCI being physically active in the community. In addition to experiential knowledge, some physiotherapists understood the importance of PA through their own embodied experience of being physical active:

Karen (10 years' experience): I would say that I was physically active because it is important to me. I think it is vital that people have the energy and physical fitness to be able to live their life how they would like to be able to live it... I know that putting weight on is detrimental to your health but I'm not necessarily in the gym every day. To me exercise is hard work. I don't look forward to being exhausted, my legs aching because I've run too far. I don't look forward to that, but I do look forward to being able to come here have scone, or have a couple of beers tonight and it doesn't matter, or matters less.

Notwithstanding the value of experiential and embodied knowledge, participants revealed that they had a limited range of other sources of PA knowledge. For example, most said they did not access peer-reviewed academic papers, web-sites, or evidence based health policy documents promoting PA. Participants also stated that they were not educated on PA during their degree course or through any training workshops. As Vicky commented (20 years' experience):

The problem is physios are not trained to properly fitness train a patient. A sports therapist may have learnt to get someone fit, but I believe in SCI there are not many physios who can just take a patient to the gym and give them fitness training that would work for them. It is not part of their obvious route. It is not yet in the culture that physical activity is something the physios should be doing.

Inconsistent physical activity promotion efforts

Despite knowing the importance of PA through experiential and embodied knowledge, and having seen the consequences of an inactive lifestyle on the health and well-being of people with SCI, active PA promotion was not a structured or integral component of most of the physiotherapists' practice. Only a minority of physiotherapists (4 participants) both valued the importance of PA *and* reported actively promoting PA throughout a patient's rehabilitation. This active PA promotion included encouraging their patients to attend available PA opportunities outside of structured physiotherapy sessions in the gym, educating them on the benefits to health and well-being from being physically active, and prescribing PA programs to allow patients to exercise independently. This small group of physiotherapists also highlighted the importance of promoting PA to people with SCI when they left rehabilitation and went back into the community. These physiotherapists were able to share knowledge regarding PA opportunities including both sport and exercise in the community, and were able to offer guidance on how often people should be physically active to achieve benefits to their health and well-being. This positive attitude towards PA promotion is illustrated by Jack (5 years' experience):

I think we as physios, we are best placed to be the ones to educate and advise and encourage our patients to take part in physical activity... There's literature out there to support that the messages and education we give spinal cord injured patients in their first few weeks of rehab tend to stick with them, so we need to make sure that we are honing in at that window of opportunity to install some education and physical activity ethos in our patients... We have to start incorporating that into our rehabilitation process, our rehabilitation management.

In contrast to the few participants who actively promoted PA, most participants did not actively promote PA. These physiotherapists were very limited in their PA promotion efforts outside of the structured gym sessions with their patients, and in some instances PA promotion was completely absent. That is, translating the importance of remaining physically active from everyday rehabilitation to sustaining long term health and well-being benefits was neglected. For example, if PA was briefly mentioned, no specific information about the types of PA, amounts and intensity of PA to achieve desired health and well-being benefits, or where to be active once in the community was said to be offered. Furthermore, there was much variance among how the physiotherapists defined PA. Sport, as opposed to general wheeling or exercise, was viewed as

the most viable option for people with PA. For higher level injuries and patients with tetraplegia, stretching and ADL (e.g. getting dressed) were considered as adequate PA as these activities could be physically draining.

There were various reasons for why the promotion of PA was neglected both within rehabilitation and the community. One reason that most of the physiotherapists failed to promote PA was because it was deemed not to be part of their role. Some participants believed the patients needed to become experts and masters of their own rehabilitation and would therefore try to foster patient autonomy by encouraging people to investigate PA opportunities themselves. Moreover, other participants considered PA promotion to be part of other healthcare professionals' (e.g. sports physiotherapists) and health practitioners' (e.g. sports therapists, personal trainers, sport and exercise scientists) role within SCI rehabilitation because they had perceived expertise in sport and exercise. However, this was only an assumption as it was not always explicitly discussed as to whose role and responsibility it was to promote PA:

Interviewer: Is there any reason why you don't promote physical activity?

Martin (8 years' experience): Well I suppose maybe just because my own role as a physio is to not to work with them towards cardiovascular goals, it might be more focused for instance towards working towards mobilization with a gait aid or upper limb function of some sort. But I tend to leave it to the physios in exercise therapy to deal with... It doesn't really occur for me to do that and it's never been a part of what we would do... Not that it's their job to do it, but they tend to do it more than we would.

A further reason as to why PA was not promoted revolved around perceived barriers to PA promotion both in rehabilitation and the community. For example, within rehabilitation these barriers included limited or no on site sport and exercise facilities, no staff resources to help take patients to the gym, a lack of support from the multidisciplinary team, and limited funding from the healthcare system to support PA initiatives. There was a sense of frustration in regards to such structural barriers as these were perceived to be out of the physiotherapists' control. Furthermore, as the physiotherapists felt they lack training in exercise prescription, there was an absence of any systematic processes in place to establish exercise programs for patients to carry out independently in the gym. Moreover some physiotherapists held certain perceptions about

their patients that prevented them from promoting PA. For example, there was a perception that not all patients, especially those with higher level injuries and subsequent paralysis, would want to see others with less paralysis and more function participating in exercise. In addition, some physiotherapists believed they were unable to change behaviour and motivate those patients with little interest in PA:

Sarah (6 years' experience): There are some patients that are always down the gym in between sessions, always working really hard. And then there are others that you just never see other than occasionally in their one-to-one session. And then it's like how do you get to those patients that aren't really doing anything? And then it's hard because there is part of me that thinks well they might never have been to a gym before... I think there's a limit on what you can do, if they're not bothered what are you going to do to make them do that (physical activity)?

Concern regarding community physical activity

In addition to the barriers to PA promotion faced by physiotherapists in rehabilitation, they held many beliefs and worries which hindered them from promoting PA within the community. For instance, the physiotherapists were concerned over the cost of personal home PA equipment (such as functional electrical stimulation) that they perceived was the only PA option for patients with higher level injuries. Thus, they would not promote this equipment. Furthermore, the physiotherapists raised concerns that there was an absence of social support within the community (e.g. healthcare professionals, family, friends etc.) to assist all people with SCI becoming physically active. Currently, patients are only referred to community physiotherapy upon discharge from the SCI centre if they have functional goals to work on. These community physiotherapists are not specialists in SCI and were deemed unlikely to know about safe and useful PA opportunities for this population. As Emma (12 years' experience) commented:

They (people with SCI) just can't get to these things and it falls down. I don't think therapists in the community are ever in a position to say fitness and health is actually a medical treatment for this guy, so we should be facilitating him to get to a gym. If we had GP prescription we'd be putting them all on it to say here is a program for the gym you go three times a week.

The physiotherapists also expressed a lack of knowledge concerning what PA opportunities were suitable for people with SCI in the community. When discussions turned towards community based PA options, the physiotherapists expressed their unease with how these centres managed hope regarding physical recovery following SCI. In particular, their concern was directed towards activity-based rehabilitation (ABR) centres. ABR is a community based PA initiative whereby people with SCI can pay to exercise with the aid of specialist health practitioners within an adapted gym facility. ABR is characterised by intensive exercise programs which aim to maximise an individual's physiological, functional and neurological potential and therefore improve their health and well-being. Due to recognizing the importance of PA, the physiotherapists thought that ABR was a good idea in theory. By this they meant that they could see the benefits of a community initiative that facilitated a physically active lifestyle for people with SCI. Moreover, the physiotherapists valued the role community health practitioners in ABR centres could play in re-educating people on aspects of SCI care, health and well-being:

Karen (10 years' experience): It (ABR) could be amazing because it's re-education again and also not only is it re-education but it's revision. When you're in hospital, when you're grieving, you are only learning or hearing 50% if that, of what you are being told. So six months post discharge actually you are looking around probably coming back up from drowning and you can take on board what the therapist is saying.

Despite the positive role that ABR could play in getting people with SCI more physically active, the physiotherapists did not actively promote ABR for people with SCI. Firstly, they perceived the goals of ABR conflicted with their goals of rehabilitation which, in turn, lead to great concerns regarding how hope was managed in this context. The physiotherapists stated their goals in rehabilitation were to teach people with SCI how to live a life that was meaningful to them, and get back to an active, happy, and independent lifestyle as soon as possible within the community. To do this, working on functional goals, such as transferring skills, was promoted. The goals of ABR were perceived to be problematic as they were focusing on activities that were not functional, such as gait training and assisted walking, neglecting the promotion of an independent lifestyle. For them, this fostered unrealistic expectations and false hope regarding functional recovery from SCI. In addition, promoting unrealistic expectations of

recovery through ABR was perceived to be a potential cause of future psychological distress and reduced well-being if recovery was not forthcoming. The unease with ABR was exemplified by Andrew (4 years' experience):

Andrew: We have patients who are complete non-functional patients who think "I'll just go here and they'll make me walk. I've seen them they get you up in a treadmill and make me walk." ...you have to be careful because you don't know where down that scale of adjustment and coping they are at and it can be dangerous.

Interviewer: What do you see as those dangers?

Andrew: I guess the dangers to me are that you are misinforming patients of unrealistic expectations and you could be setting them up for a crash. You know they've already had a life changing traumatic event, you don't want them to build all their hopes, all their expectations... on a potential false hope.

Discussion

The purpose of this study was to explore the *perceptions* of physiotherapists in SCI rehabilitation on PA for people with SCI, and *what* is done to promote PA. Despite the need to promote PA behaviour amongst disabled people [13,15], this is the first empirical study to investigate physiotherapists' beliefs about PA for people with SCI and their actions regarding PA promotion within rehabilitation and in the community in the UK and Ireland. In addition, the paper has made a contribution to the literature by identifying that, whilst physiotherapists do value the importance of PA for people with SCI, PA promotion remains largely absent within the UK and Ireland SCI rehabilitation context. This is despite physiotherapists being identified by spinal cord injured people as trusted and valued messengers of PA [15,22,23], and physiotherapy being identified as the ideal profession to promote, guide and prescribe PA.[13,23-28] The inconsistent PA promotion efforts from the physiotherapists also highlight the lack of structured and embedded PA promotion practices across SCI centres in the UK and Ireland.

Based upon the empirical data, there were several factors that impacted PA promotion. Firstly, this study highlighted a lack of formal training and education in sport and exercise to enable all physiotherapists to effectively promote and prescribe PA to people with SCI. In line

with current literature in general healthcare settings [30], this perceived lack of education had a negative influence on the physiotherapists PA promotional practices. In addition to the existing literature, this study highlighted the understanding physiotherapists gained about the importance of PA was “tacit knowledge” gained through experience rather than “explicit knowledge” gained through training.[43] This tacit knowledge was acquired through practical experience of working with people with SCI over time and embodied experiences of being physically active themselves. The physiotherapists had not obtained explicit knowledge on PA promotion in rehabilitation or the community from the various sources available, including research policy documents, their physiotherapy degree course, sport and exercise scientists or workshops in rehabilitation centres. Furthermore this lack of explicit knowledge regarding PA may explain the variation in what the physiotherapists considered to be adequate PA for their patients. While some believed that sport was the most viable option for people with SCI to be physically active, others perceived stretching and ADL to be sufficient.

Secondly, this study highlighted a lack of clarity within the healthcare system as to the roles and responsibilities of health care professionals in PA promotion. Despite physiotherapists being identified as the healthcare professional best placed to promote PA, not all of the physiotherapists in this study considered their role in SCI rehabilitation to include PA promotion. Other tasks such as working on functional goals and ADL to increase independence took priority in physiotherapy sessions, with PA promotion considered to be the role of other healthcare and health professionals. Furthermore, echoing research in the UK [27] and other countries such as Sweden and New Zealand [12], the physiotherapists located multiple barriers to PA promotion within the healthcare system they worked in. These barriers included limited sport and exercise facilities within rehabilitation, a lack of funding to support PA initiatives and an absence of social support within the community to assist people with SCI becoming physically active. Furthermore, these socially created barriers are in line with the social relational model of disability. The social relational model of disability encompasses disablism and highlights how disabled people experience various forms of oppression which restrict their activities (e.g. PA) and can therefore damage well-being.[44]

Thirdly, the physiotherapists held certain beliefs about PA which restricted their PA promotional practices. For example, they perceived they did not have the required skills to

change health behaviour. Consistent with research in stroke rehabilitation [45] and general healthcare [46], the physiotherapists in this study perceived that patients' lack of motivation to be physically active was fixed and that they were unable to influence behaviour change. This is an important finding considering that behaviour change and fostering adherence to treatment plans is important in physiotherapy practice.[28,47,48] Furthermore, the majority of physiotherapists held concerns regarding how hope of recovery was managed in community PA initiatives, such as ABR, and the promotion of what is termed the *exercise is restitution* narrative. The exercise is restitution narrative has a storyline that projects a concrete hope for recovery or cure following SCI through engaging in exercise.[49] These beliefs regarding PA initiatives such as ABR highlight a breakdown in communication between the physiotherapists in SCI centres and health practitioners in the community. Drawing upon the social relational model of disability, not promoting PA through ABR could also be viewed as a form of social oppression. In this instance the physiotherapists were enacting psycho-emotional disablism [44] by denying their patients the option to remain physically active through ABR.

In light of these findings, to enable physiotherapists to promote and prescribe PA as a structured and integral component of their practice, several implications arise regarding knowledge translation (KT). Effective KT is essential for the implementation of behaviour change in healthcare [29,50] and requires the combined efforts of national policy makers, healthcare systems, healthcare professionals, academics and community-based expertise.[25,33,43,46,51,52] However, changing the behaviour of those in healthcare is a complex process.[50] That said, there are various strategies that can be drawn upon across the macro, meso and micro levels within the healthcare system to improve PA promotional practices within SCI rehabilitation. As outlined by the World Health Organization (WHO), the macro, meso and micro level provide a useful framework to address policy, the healthcare and community level, and patient interaction respectively.[53] Similarly, an ecological framework also recognises that individual behaviour is influenced by socio-political influences such as policy, the surrounding physical environment, and social circumstances.[54] Taken together, both frameworks advocate a “bigger picture” approach when addressing behaviour change as each level dynamically interacts and influences the others.

Starting with knowledge production, at the macro level PA policy makers need to engage with academics (and vice versa) to drive meaningful guidelines on PA which are evidence-based from research on the health benefits derived from exercising with SCI.[55] Despite guidelines in other countries [55], there are currently no evidence-based comprehensive PA guidelines developed and embedded into UK and Ireland policies to be received and utilised by physiotherapists. These guidelines should include specific details about the amounts, types and intensity of physical activities to achieve health benefits.[55] Developing comprehensive, sustainable and realistic PA guidelines specifically for people with SCI could address the physiotherapists' lack of knowledge and confidence in PA prescription and promotion. Not only do guidelines need developing that are context specific (e.g. UK based), but these need to be created *with* people with SCI. Their involvement through the whole process of creation is essential if what is produced is to be meaningful and have wide impact. In other words, to use UK terminology, patient and public involvement (PPI) is vital.[56] This involvement extends into other areas, including the need to transform guidelines into highly accessible formats (e.g., web-based/e-health, story based, and/or infographics).[23]

To address the translational gap between knowledge produced at the macro level to knowledge utilization at the micro level, appropriate training and education needs to be delivered. Specifically, physiotherapists need training on PA and SCI to equip them with sufficient knowledge to prescribe and promote PA.[28,33] At the meso level all university degree courses should educate physiotherapists on the importance of PA both as a component of their treatment in rehabilitation, and promotion of long term health and well-being in the community.[48] Furthermore, this training should continue at the micro level with rehabilitation centres delivering workshops on PA to establish promotion of PA as a structured and integral component of physiotherapy practice.[27] It is essential that hospitals deliver mandatory training to enhance healthcare professionals' understanding of their role and responsibility in PA promotion and facilitate communication between the multidisciplinary team (e.g. physiotherapists, sport therapists).[27,46,50] To maximize the potential of PA promotion resulting in an increase in PA uptake, physiotherapists could additionally be trained in psychosocial factors such as motivational interventions to foster positive health behaviour change.[28,45,48] Moreover, key questions regarding *how* knowledge is disseminated to impact upon practice need to be addressed. For instance, narrative (e.g. evidence based stories) has been

identified as one avenue knowledge about PA can be effectively translated to healthcare professionals in SCI rehabilitation.[23]

Importantly, the knowledge on PA promotion needs to include the diversity of PA opportunities available to people with SCI. A key reason for this is that the focus of PA in the SCI centres in this sample was predominantly sport. This could be problematic for at least two reasons. Firstly, sport can be empowering and promote health and well-being, but if physiotherapists simply promote this kind of activity, there is the risk of perpetuating the ‘supercrip’ narrative. A supercrip is a disabled athlete that with courage, dedication and hard work proves that the odds can be beaten, the impossible can be accomplished and one can heroically triumph over the ‘tragedy’ of disability.[57,58] The concern with supercrip athletes, as noted by Berger [58,p.648], “is that these stories of success will foster unrealistic expectations about what people with disabilities can achieve, what they should be able to achieve, if only they tried hard enough”. This, in turn, could lead to disabled people who do not wish to, or are unable for bodily, structural or economic reasons, being blamed for not engaging in disability sport.[57] Equally, while the supercrip narrative may interpellate (i.e. hail) some people into disability sport, for others it may turn them away from sport.[15] Secondly, an exclusive focus on sport could discourage activity for those who do not like sport. Indeed, people with SCI often report wanting to do other activities over sport, including aerobic exercise, resistance training and wheeling.[59]

Thus, a wider range of options to be physically active need to be offered and supported following SCI. This support may come from greater alignment with the various organisations championing the rights of disabled people to lead a physically active lifestyle (e.g. Disability Rights UK, English Federation of Disability Sport, Irish Sports Council) and community based PA options such as ABR. However, the physiotherapists in this sample did not promote ABR due to the various concerns they held. The concerns with ABR, such as promoting an unrealistic restitution narrative and concrete hope of walking again, arise from physiotherapists’ professional ethic to keep their patients safe.[45] To address these concerns, physiotherapists should analyse and justify their ethical decision making by respecting their patients’ rights to maintain a physically active lifestyle and appreciating their patients’ beliefs and opinions about ABR.[60] Moreover, the physiotherapists should reflect on their own values and assumptions of

what constitutes “the good life” and the well-being of their patients, and how this impacts upon their PA promotional practices within SCI rehabilitation.[61] To facilitate this, closer communication and engagement should be implemented at the meso and micro level between physiotherapists in SCI centres and those working in community based PA initiatives.[30] For example, physiotherapists need to be informed of the time, effort and resources required to take part in ABR, as well as the likely impact on health and well-being. This would enable patients with SCI to make informed decisions with their physiotherapists about engaging in such programs.[60,62,63]

In conclusion, despite calls for physiotherapists to promote a physically active lifestyle to their patients, within our sample in SCI rehabilitation this was largely not occurring. These findings echo the work of previous literature by identifying multiple barriers faced by healthcare professionals to PA promotion within their practice. In addition to the existing literature, we have identified specific factors which influence physiotherapists’ promotion of PA to people with SCI. Whilst acknowledging the complexity of effectively translating knowledge into practice in rehabilitation, we propose systematic KT strategies need designing and implementing at the macro, meso and micro levels to help improve PA promotion.

Declaration of Interest

The authors report no declarations of interest.

References

- 1 Hitzig SL, Tonack M, Campbell K, McGillivray CF, Boschen K, Richards K, Craven CB. Secondary health complications in an aging Canadian spinal cord injury sample. *Am J Phys Med Rehab.* 2008;87:545-555.
- 2 Chen Y, Cao Y, Allen V, Richards S. Weight matters: Physical and psychosocial well-being of persons with spinal cord injury in relation to body mass index. *Arch Phys Med Rehab.* 2011;92:391-398.
- 3 Canning KL, Hicks AL. Secondary health conditions associated with spinal cord injury. *Crit Rev Phys Rehab Med.* 2014;26:181-191.

- 4 Krause KS, Saunders LL. Health, secondary conditions, and life expectancy after spinal cord injury. *Arch Phys Med Rehab.* 2011;92:1770-1775.
- 5 Ryan RM, Deci EL. On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annu Rev Psychol.* 2001;52:1411-66.
- 6 Keyes CL, Shmotkin D, Ryff CD. Optimizing well-being: The empirical encounter of two traditions. *J Pers Soc Psychol.* 2002;82:1007-1022.
- 7 Geyh S, Nick E, Stirnimann D, Ehrat S, Müller R, Michel F. Biopsychosocial outcomes in individuals with and without spinal cord injury: A Swiss comparative study. *Spinal Cord.* 2012;50:614-622.
- 8 Post MWM, Van Leeuwen, CMC. Psychosocial issues in spinal cord injury: A review. *Spinal Cord.* 2012;50:382-389.
- 9 Craig A, Tran Y, Middleton J. Psychological morbidity and spinal cord injury: A systematic review. *Spinal Cord.* 2009;47:108-114.
- 10 Williams R, Murray A. Prevalence of depression after spinal cord injury: A meta-analysis. *Arch Phys Med Rehab.* 2015;96:133-140.
- 11 Nunnerley J, Hay-Smith E, Dean S. Leaving a spinal unit and returning to the wider community: An interpretative phenomenological analysis. *Disabil Rehabil.* 2013;35:1164-1173.
- 12 Mulligan H, Fjellman-Wiklund A, Hale L, Thomas D, Hager-Ross C. Promoting physical activity for people with neurological disability: perspectives and experiences of physiotherapists. *Physiother Theory Pract.* 2011;27:399-401.
- 13 World Confederation of Physical Therapy [Internet]. Active and healthy: The role of the physiotherapist in physical activity (briefing paper). 2012 (cited 2015 Aug 10). Available from: <file:///C:/Users/pstlw/Downloads/PI%20WG%20-%20Adopted%20Briefing%20paper%20-%20Active%20and%20healthy%202012%20GM.pdf>.

- 14 Martin Ginis KA, Latimer AE, Arbour-Nicitopoulos KP, Buchholz AC., Bray SR, Craven BC, Hayes KC, Hicks AL, McColl MA, Potter PJ, Smith K, Wolfe DL. Leisure time physical activity in a population- based sample of people with spinal cord injury Part I: Demographic and injury-related correlates. *Arch Phys Med Rehabil.* 2010;91:722-728.
- 15 Smith, B. (2013). Disability, sport and men's narratives of health: A qualitative study. *Health Psychol.* 2013;32:110-119.
- 16 Buchholz AC, Martin Ginis KA, Bray SR, Craven BC, Hicks AL, Hayes KC, Latimer AE, McColl MA, Potter PJ, Wolfe DL. Greater daily leisure time physical activity is associated with lower chronic disease risk in adults with spinal cord injury. *Appl Physiol Nutr Me.* 2009;34:640-647.
- 17 Martin Ginis KA, Jörgensen S, Stapleton J. Exercise and sport for persons with spinal cord injury. *PM&R.* 2012;4:894-900.
- 18 Norrbrink C, Lindberg T, Wahman K, Bjerkefors A. Effects of an exercise programme on musculoskeletal and neuropathic pain after spinal cord injury—results from a seated double-poling ergometer study. *Spinal Cord.* 2012;50:457-461.
- 19 Hicks AL, Martin KA, Ditor DS, Latimer AE, Craven C, Bugaresti J, McCartney N. Long-term exercise training in persons with spinal cord injury: Effects on strength, arm ergometry performance and psychological well-being. *Spinal Cord.* 2003;41:34-43.
- 20 Williams TL, Smith B, Papathomas A. The barriers, benefits and facilitators of leisure time physical activity among people with spinal cord injury: A meta-synthesis of qualitative findings. *Health Psychol Rev.* 2014;8:404-425.
- 21 Day MC. The role of initial physical activity experiences in promoting posttraumatic growth in Paralympic athletes with an acquired disability. *Disabil Rehabil.* 2013;35:2064-2072.
- 22 Letts L, Martin Ginis KA, Faulkner G, Colquhoun H, Levac D, Gorczynski P. Preferred methods and messengers for delivering physical activity information to people with spinal cord injury: A focus group study. *Rehabil Psychol.* 2011;56:128-137.

- 23 Smith B, Tomasone JR, Latimer-Cheung AE, Martin Ginis KA. Narrative as a knowledge translation tool for facilitating impact: Translating physical activity knowledge to disabled people and health professionals. *Health Psychol.* 2015;34:303-313.
- 24 Verhagen E, Engbers L. The physical therapist's role in physical activity promotion. *Br J Sports Med.* 2008;43:99-101.
- 25 Morris JH, Williams B. Optimising long-term participation in physical activities after stroke: Exploring new ways of working for physiotherapists. *Physiotherapy* 2009;95:227-233.
- 26 O'Donoghue G, Dean E. The physiotherapist's role in contemporary health care in Ireland: Responding to 21st century indicators and priorities. *Physiother Pract Res.* 2010;1:4-9.
- 27 Walkeden S, Walker KM. Perceptions of physiotherapists about their role in health promotion at an acute hospital: a qualitative study. *Physiotherapy.* 2015;101:226-231.
- 28 McGrane N, Galvin R, Cusack T, Stokes E. Addition of motivational interventions to exercise and traditional Physiotherapy: a review and meta-analysis. *Physiotherapy.* 2015;101:1-12.
- 29 Cane J, O'Connor D, Michie S. Validation of the theoretical domains framework for use in behaviour change and implementation research. *Implement Sci.* 2012;7:37.
- 30 Huijg JM, Gebhardt WA, Verheijden MW, Van Der Zouwe N, De Vries JD, Middelkoop BJ, Crone MR. Factors influencing primary health care professionals' physical activity promotion behaviors: a systematic review. *Int J Behav Med.* 2015;22:32-50.
- 31 Sparkes AC, Smith B. *Qualitative Research Methods in Sport, Exercise & Health: From process to product.* London: Routledge; 2014.
- 32 Lincoln Y. "What a long, strange trip it's been": Twenty-five years of qualitative and new paradigm research. *Qual Inq.* 2010;16:3-9.
- 33 Wong S, van Middendorp J, Belci M., van Nes I, Roels E, Smith É, Hirani SP, Forbes A. Knowledge, attitudes and practices of medical staff towards obesity management in

- patients with spinal cord injuries: an International survey of four western European countries. *Spinal Cord*. 2015;53:24-31.
- 34 Kaiser K. Protecting respondent confidentiality in qualitative research. *Qual Health Res*. 2009;19:1632-1641.
- 35 O'Reilly M, Parker N. "Unsatisfactory saturation": A critical exploration of the notion of saturated sample sizes in qualitative research. *Qual Res*. 2013;13:190-197.
- 36 Braun V, Clarke V, Weate P. Using thematic analysis in sport and exercise research. In: Smith B, Sparkes AC, editors. *Routledge handbook of qualitative research methods in sport and exercise*. London: Routledge; 2016. p. 191-205.
- 37 Sparkes AC, Smith B. Judging the quality of qualitative inquiry: Criteriology and relativism in action. *Psychol Sport Exerc*. 2009;10:491-497.
- 38 Burke S. Rethinking 'validity' and 'trustworthiness' in qualitative inquiry: How might we judge the quality of qualitative research in sport and exercise sciences? In: Smith B, Sparkes AC, editors. *Routledge handbook of qualitative research in sport and exercise*. London: Routledge; 2016. p. 330-339.
- 39 Smith J, Deemer D. The problem of criteria in the age of relativism. In: Denzin N, Lincoln Y, editors. *Handbook of qualitative research*. 2nd ed. Thousand Oaks, CA: Sage; 2000. p. 877-922.
- 40 Tracy SJ. Qualitative quality: eight "big-tent" criteria for excellent qualitative research. *Qual Inq*. 2012;16:837-851.
- 41 Morse JM. Critical analysis of strategies for determining rigor in qualitative inquiry. *Qual Health Res*. 2015;25:1212-1222.
- 42 Guba E, Lincoln Y. *Fourth generation evaluation*. London: Sage; 1989.

- 43 Ferlie E, Crilly T, Jashapara A, Peckham A. Knowledge mobilisation in healthcare: a critical review of health sector and generic management literature. *Soc Sci Med.* 2012;74:1297-1304.
- 44 Thomas C. *Sociologies of disability and illness: Contested ideas in disability studies and medical sociology.* Basingstoke: Palgrave Macmillan; 2007.
- 45 Morris JH, Oliver T, Kroll T, Joice S, Williams B. From physical and functional to continuity with pre-stroke self and participation in valued activities: A qualitative exploration of stroke survivors', carers' and physiotherapists' perceptions of physical activity after stroke. *Disabil Rehabil.* 2014;37:64-77.
- 46 Huijg JM, Van Der Zouwe N, Crone MR, Verheijden MW, Middelkoop BJ, Gebhardt WA. Factors influencing the introduction of physical activity interventions in primary health care: a qualitative study. *Int J Behav Med.* 2015;22:404-414.
- 47 Jack K, McLean SM, Moffett JK, Gardiner E. Barriers to treatment adherence in physiotherapy outpatient clinics: A systematic review. *Manual Ther.* 2010;15:220-228.
- 48 Heaney C. A qualitative and quantitative investigation of the psychology content of UK physiotherapy education. *J Phys Ther Educ.* 2012;26.
- 49 Papathomas A, Williams TL, Smith B. Understanding physical activity participation in spinal cord injured populations: Three narrative types for consideration. *Int J Qual Stud Health Well-being.* 2015;10:27295.
- 50 Jones CA, Roop SC, Pohar SL, Albrecht L, Scott SD. Translating knowledge in rehabilitation: systematic review. *Phys Ther.* 2015;95:663-677.
- 51 Tomasone JR, Martin Ginis KA, Estabrooks PA, Domenicucci L. Changing minds, changing lives from the top down: An investigation of the dissemination and adoption of a Canada-wide educational intervention to enhance health care professionals' intentions to prescribe physical activity. *Int J Behav Med.* 2014;22:336-344.

- 52 Kerner J, Rimer B, Emmons K. Introduction to the special section on dissemination: Dissemination research and research dissemination: How can we close the gap? *Health Psychol.* 2005;24:443-446.
- 53 World Health Organization [Internet]. Innovative care for chronic conditions: building blocks for action: global report. 2002 (cited 2016 Jun 12). Available from: http://www.who.int/chp/knowledge/publications/iccc_ch2.pdf.
- 54 Biddle SJH, Mutrie N, Gorely T. *Psychology of physical activity: Determinants, well-being and interventions.* 3rd ed. Oxon: Routledge; 2015.
- 55 Martin Ginis KA, Hicks AL, Latimer AE, Warbuton DER, Bourne C, Ditor DS, Goodwin DL, Hayes KC, McCartney N, McIlraith A, Pomerleau P, Smith K, Stone JA, Wolfe DL. The development of evidence-informed physical activity guidelines for adults with spinal cord injury. *Spinal Cord.* 2011;49:1088-1096.
- 56 Mockford C, Staniszewska S, Griffiths F, Herron-Marx S. The impact of patient and public involvement on UK NHS health care: a systematic review. *Int J Qual Health C.* 2012;24:28-38.
- 57 Smith B, Sparkes AC. Disability, sport and physical activity. A critical review. In: Watson N, Roulstone A, Thomas C, editors. *Routledge Handbook of Disability Studies.* London: Routledge; 2012. p 336-347.
- 58 Berger RJ. Disability and the dedicated wheelchair athlete: Beyond the “supercrip” critique. *J Contemp Ethnogr.* 2008;37:647-678.
- 59 Martin Ginis KA, Arbour-Nicitopoulos KP, Latimer AE, Buchholz AC, Bray SR, Craven BC, Hayes KC, Hicks A.L, McColl MA, Potter PJ, Smith K, Wolfe DL. Leisure time physical activity in a population-based sample of people with spinal cord injury part II: Activity types, intensities, and durations. *Arch Phys Med Rehabil.* 2010;91:729-733.
- 60 Drolet M-J, Hudon A. Theoretical frameworks used to discuss ethical issues in private physiotherapy practice and proposal of a new ethical tool. *Med Health Care Philos.* 2015;18:51-62.

- 61 Gibson B. *Rehabilitation: A post critical approach*. Florida: CRC Press; 2016.
- 62 Jones ML, Evans N, Tefertiller C, Backus D, Sweatman M, Tansey K, Morrison S. Activity-based therapy for recovery of walking in chronic spinal cord injury: results from a secondary analysis to determine responsiveness to therapy. *Arch Phys Med Rehabil*. 2014;95:2247-2252.
- 63 Petersen A, Seear K, Munsie M. Therapeutic journeys: the hopeful travails of stem cell tourists. *Sociol Health Ill*. 2013;36:670-685.