NOVEMBER 2015 | VOLUME 43 | NUMBER 3: 73-114

ISSN 0303-7193 (PRINT)
ISSN 2230-4886 (ONLINE)

NZJP

NEW ZEALAND JOURNAL OF PHYSIOTHERAPY

- Physiotherapy's place in the world
- Community reintegration following spinal cord injury
- Therapeutic positional preferences of pregnant women
- Perceptions of PAR in developing a health resource
- Physical activity for individuals with severe neurological disability
- Bridging the intention behaviour gap

PHYSIOTHERAPY NEW ZEALAND
Kōmiri Aotearoa

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New Zealand Journal of Physiotherapy
Official Journal of Physiotherapy New Zealand

ISSN 0303-7193

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Physiotherapy's place in the world

The right to health as a fundamental human right was agreed to over 50 years ago in the constitution of the World Health Organization (WHO (1948)). Subsequently in its resolution 2002/31, the United Nations Commission on Human Rights took a step used only for the most important matters affecting global society, and created a mandate of Special Rapporteur on the right of everyone to enjoy the highest attainable standard of physical and mental health. The resolution was endorsed and extended by the Human Rights Council, resolution 6/29 (United Nations Office of the High Commissioner for Human Rights, 2007). At this point in time the world is nowhere near its target of everyone enjoying the highest attainable standard of physical and mental health, though there have been some major advances. For example, global life expectancy in 1955 was 48 years and by 2025 it is estimated to be 73 years, and cross country differences in life expectancy have fallen (Laxminarayan et al 2006).

What voice does physiotherapy have in progress towards the right for all to health? The World Confederation for Physical Therapy (WCPT) is the international voice for physiotherapists around the world. Through its official relation with the WHO, WCPT is consulted on many issues addressed by the WHO; is actively involved with many of the WHO's reference groups, including the group that has just released the World Report on Ageing and Health (WHO, 2015); and advises on matters such as the International Classification of Functioning, Disability and Health.

WCPT is committed to furthering the physiotherapy profession and improving global health and wellbeing through promotion of high standards of practice, education and research. (WCPT, 2013). To achieve its vision the global profession must keep focused on the key factors that describe physiotherapy, and the influence that physical inactivity has on the primary factors impacting on global health, namely non communicable diseases (NCDs) and an ageing society. WCPT believes that physiotherapists are equipped, through their education, to meet the needs of people with or at risk of NCDs; and to provide evidence based interventions that can reduce the incidence of NCDs and associated disability and mortality; as well as playing a vital role in the prevention and management of NCDs (WCPT 2015a).

In order to continue to make a positive contribution to improving global health the profession must ensure that the world has a practice ready physiotherapy workforce and that each country has a physiotherapy workforce that is sufficient to meet the demands of the population. A practice ready workforce means we must link entry level education to practice models that meet health needs of the future and that there is a match between curriculum content and global health priorities. For physiotherapy the variation across schools and the mismatch between curriculum and global health priorities have been highlighted over recent years (Dean et al 2011) and the argument for evidence-based core competencies in health assessment and lifestyle behaviour change being included as a core part of student learning has been promoted (Dean et al 2014). As well, there has been a call to realign physiotherapy education to place an emphasis on interprofessional education, including interprofessional competencies such as health promotion, which fit with future societal health needs and more collaborative, sustainable health (Dean et al 2014).

Schools of physiotherapy around the world need to ensure that they are making such changes in the context of the cultural and societal needs of their populations and working with other colleagues to embrace interprofessional education as a practice model for all intending health professionals.

Physiotherapy is not the only health profession falling short of its requirement to ensure a practice-ready workforce. Several recently published reports have described major mismatches between current health professional education and current health practice needs, including the report by the WHO (2010). The WHO supports the model of collaborative practice as the way forward for health (WHO 2010). Evidence confirms collaborative practice provides for improved access to health interventions and improved coordination between different sectors; a more patient/family centred role in decision making; a system that is more responsive to health needs; more efficient use of resources; reduction in the incidence and prevalence of disability when the collaborative practice model is used across the spectrum of ICD management; and for health professionals collaborative practice is associated with increased job satisfaction, reduced stress and less burnout (WHO 2010).

In 2012 Health Workforce New Zealand provided funding to both the University of Auckland and the University of Otago and their partner institutes to each establish a three year trial using a model of interprofessional education as a way of engaging with rural communities with high health needs, and with the potential outcome that some students who have had clinical experience in an interprofessional education setting using the model would return to these communities to practise. One such programme run by the University of Otago in the Tairāwhiti region has already demonstrated that not only are there benefits to students and staff engaged in interprofessional education but also benefits to the community through social accountability (Gallagher et al 2015).

More opportunities for students to engage in interprofessional education will be important to ensure the global physiotherapy profession is prepared to take our place as practice ready health professionals for a future where NCDs will continue to predominate. Other priorities that must also be addressed globally at the foundation level include a realignment of curriculum content with the current evidence for healthy ageing (WHO 2015) and increasing opportunities in many countries for more students to access physiotherapy entry level education to correct the imbalance in supply and demand (WCPT 2015b). If we achieve these priorities we shall be well along the path of ensuring not only that access to physiotherapy services is a right, but that the global population can enjoy the highest attainable standard of physiotherapy.

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doi 10.15619/NZJP/43.3.01

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Community reintegration following spinal cord injury: Insights for health professionals in community rehabilitation services in New Zealand

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ABSTRACT

When returning home following a spinal cord injury (SCI), individuals will be in contact with a range of health professionals who will be involved in their ongoing rehabilitation. This study explored the qualitative literature to determine what individuals with SCI perceive to be the barriers or facilitators to community reintegration to provide insights for health professionals working in community rehabilitation services in New Zealand. The databases of Ovid Medline, CINAHL, the Allied and Complementary Medicine Database (AMED), Cochrane Database of Systematic Reviews and PEDro were searched for relevant articles. Barriers and facilitators to community reintegration were classified into the International Classification of Functioning, Disability and Health (ICF) framework with the addition of self-management factors to further define personal factors. Of the 381 studies uncovered in the search, seven met the inclusion criteria. Findings revealed that accessibility of the environment, re-establishing self, support and connections were strong themes for reintegration. The challenge for health professionals working in the community with individuals with SCI is to be client-centred and ensure the individual's needs are suitably met to support them to re-connect with their work and community life.

Dwyer KJ, Mulligan H (2015) Community reintegration following spinal cord injury: Insights for health professionals in community rehabilitation services in New Zealand. New Zealand Journal of Physiotherapy 43(3): 75-85. doi 10.15619/NZJP/43.3.02

Keywords: barriers, facilitators, community reintegration, spinal cord injury

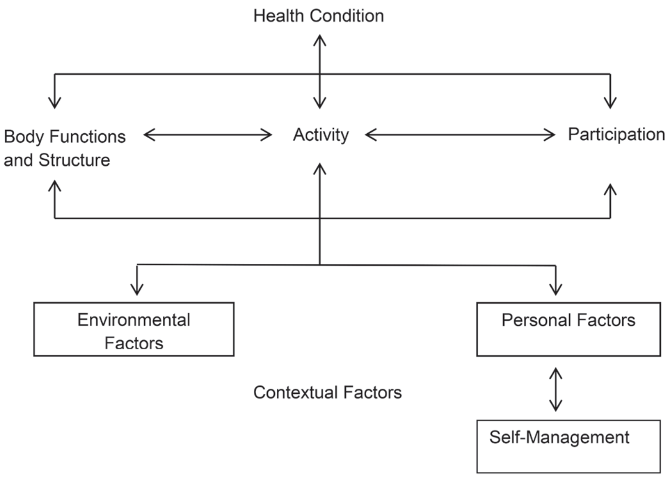
INTRODUCTION

Following a spinal cord injury (SCI), an individual will spend several weeks or months undergoing rehabilitation in a specialised facility such as a spinal unit. New Zealand has two spinal units; one in Auckland and the other in Christchurch. Considering that many people live outside of these cities, a considerable number of individuals will leave the communities in which they reside to undergo months of rehabilitation as an inpatient in one of these two units (Sinnott et al 2010). Following discharge from the spinal unit, these individuals may return to only partially accessible homes, or alternatively, be discharged to temporary accommodation such as a motel while awaiting modifications to their own house for it to be made accessible. Over the weeks and months following discharge, housing, transport and equipment issues are generally resolved together with input from a range of health professionals. Physiotherapists, occupational therapists, clinical psychologists, nurses and vocational rehabilitation providers then continue working with the individual with SCI in the months and early years post-injury, with the focus shifting to community reintegration for the individual to resume activities, leisure pursuits and work (Hay-Smith et al 2013, Kendall et al 2003). The process of reintegrating back to their local community is usually difficult and challenging (Gargaro et al 2013). Indeed, apprehension regarding discharge and a sudden transition to home from the spinal unit environment was identified as an issue for individuals with SCI in New Zealand when interviewed as part of a large international study examining the lived experience of individuals with SCI (Sinnott et al 2010). Such findings highlight the need to address the process for community reintegration for people with SCI.

Community reintegration is a broad term encompassing the process of returning home and re-establishing life following an event such as SCI. Dijkers (1998, p 5) provides this definition "Community (re-)integration (after/with (physical) impairment or disability) is acquiring/resuming age-/gender-/culture-appropriate roles/statuses/activities, including independence/interdependence in decision making, and productive behaviours performed as part of multivaried relationships with family, friends, and others in natural community settings". This definition fits well with the International Classification of Functioning, Disability and Health (ICF) when used as a bio-psychosocial framework to consider the interaction between health, function and participation and the contextual impact of the person and their environment (Figure 1) (World Health Organisation 2002). The term 'environment' encapsulates both physical factors (such as the built environment) and social factors (such as attitudes within society) that may influence a person's ability to function. Thus, the ICF could be used as a framework to assist in identifying where the complex and multifactorial barriers and facilitators to community reintegration lie for individuals with SCI.

To further investigate and identify personal factors outlined under the ICF, personal factors that allow or develop self-management skills can be added as a subset (Figure 1). This is because when individuals are discharged home, they move from

Figure 1: International Classification of Functioning, Disability and Health framework with self-management.



the relatively controlled environment of the spinal unit where systems are in place to manage SCI and health professionals are readily available, to the community where there is considerably less monitoring and oversight. The ability to make this transition and manage one's own health and physical needs associated with SCI is important. Self-management is defined as having the self-efficacy to be able to take responsibility for managing the day-to-day aspect of one's own long-term condition (Lorig and Holman 2003). Self-efficacy is described as the belief in oneself to be able to accomplish a task and self-esteem as the belief in oneself per se (Geyh et al 2012, Bandura 1977). Geyh et al (2012) linked self-efficacy and self-esteem to personal factors under the ICF framework. In a questionnaire study of 102 individuals less than five years post SCI, they found strong links between self-efficacy and self-esteem in relation to participation regardless of gender, age, level and completeness of injury. Therefore, for individuals with SCI, it appears that developing self-efficacy or confidence in their ability to manage themselves would be key to their participation in community life.

A review of the literature by Gargaro et al (2013) used the ICF model to classify environmental and personal barriers and facilitators to community reintegration following SCI. The 31 studies included in this review used questionnaires and standardised tools that examined community integration, degree of disability/function, environmental factors and quality of life. While such an approach can provide general information about the focus of the enquiry, it does not however provide or explore the more detailed and explanatory information that could be uncovered by qualitative investigation.

The purpose of this paper was to review the qualitative literature to explore what individuals with SCI perceive to be the barriers or facilitators to their community reintegration. By doing so, we aimed to provide insights for health professionals to consider when working in community rehabilitation services for individuals with SCI in New Zealand.

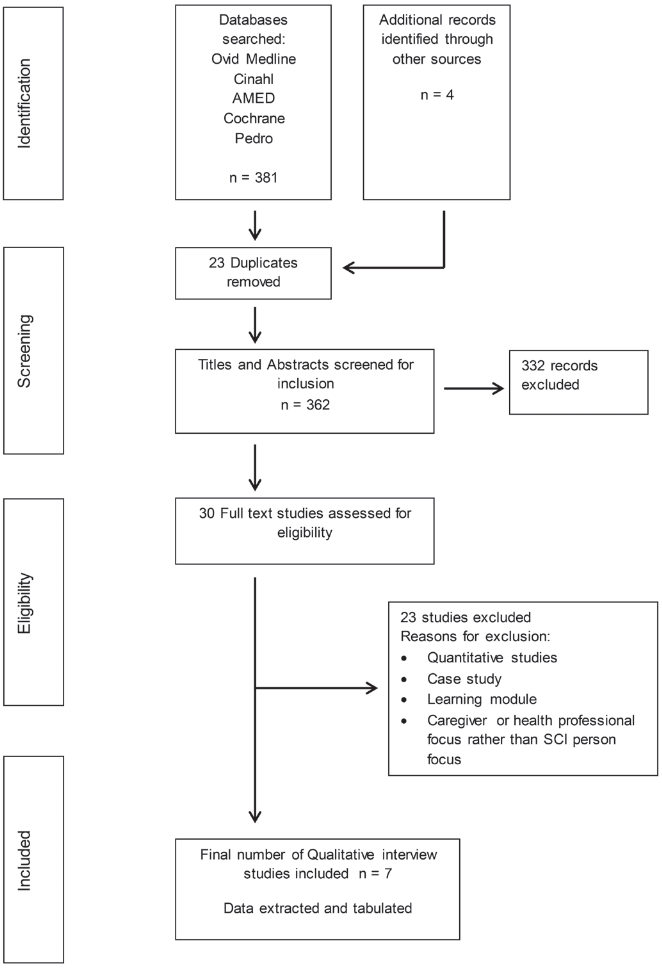
METHODS

Literature Search

A literature search was conducted using the electronic databases Ovid Medline, CINAHL, the Allied and Complementary Medicine Database (AMED), Cochrane Database of Systematic Reviews and PEDro. Search terms were: spinal cord injuries or spinal cord injur*, or SCI, or paraplegia, or quadriplegia, or tetraplegia, combined with community reintegration or community integration. Search limits included articles that were written in English and published in a peer-reviewed journal. We also confined the search to articles published since 2000 to limit the data to more recent studies which would therefore potentially be relevant to the present day context. Studies about adults with SCI that were wholly qualitative (interview or focus group) in nature or contained a qualitative component within a mixed methods study design were included. Conference abstracts, expert opinion, review studies and quantitative studies were excluded.

The search resulted in 385 articles in total; 381 were sourced from the databases with a further four articles obtained via a hand search of the references of these studies. Duplicates were removed and 362 article titles and abstracts were screened by the first author for inclusion. A further 332 articles were excluded and the full text of the remaining 30 articles was read. Following discussion between both authors, a further 23 studies were excluded as they were either quantitative studies, case studies, learning modules or had a caregiver or health professional focus rather than SCI person focus. This left seven studies that were included for review (Figure 2).

Figure 2: Flow chart of the literature search and selection process.



Assessment/Review of Quality

The Mixed Methods Appraisal Tool (MMAT) was chosen to assess the quality of methodology because this instrument can be used to appraise studies that employ qualitative, quantitative or mixed methodology (Pluye et al 2009). Criteria specific to a particular methodology are assessed and scored. For example, the qualitative domain scores the following criteria: sources of data, processes for analysis of the data in relation to the research question, consideration for how findings relate to the setting in which the data were collected, and the influence the researcher has on the findings. There are a maximum of four criteria under each domain; therefore, each criterion is worth 25%, and the final score (expressed as a percentage) indicates the level of quality for a particular study.

Data Extraction

Data that identified the barriers or facilitators to community reintegration were extracted from the seven studies and tabulated, and the MMAT rating identified (Table 1). The barriers or facilitators were then collated and transferred onto the ICF framework of domains, with factors related to personal skills for self-management added to the personal domain. Environmental factors were subdivided into physical and social categories as modelled in a publication by Mulligan et al (2012) to provide more clarity about these factors.

RESULTS

Of the seven studies included, five used only qualitative methodology and the other two incorporated qualitative components within a mixed methods approach. There were a total of 373 participants in the seven studies which were conducted in the United States of America (USA), Canada, United Kingdom, Europe, Australia and New Zealand. Appraisal of all seven studies resulted in them being rated as having similar methodological quality; therefore, similar weighting has been given to the findings from the individual studies included in this review. Figures 3 and 4 clearly demonstrate that the majority of both barriers and facilitators fall under environmental and personal factors (including self-management factors).

Barriers to Community Reintegration Following SCI

Body Function and Structure

Three studies reported loss of fitness and increasing weakness, perceived as being due to reduced therapy input and lack of access to exercise options following discharge to the community, as barriers, along with health complications (Boschen et al 2003, Dickson et al 2011, Silver et al 2012). One study also identified pain as a hindrance to daily activities and noted that this became more prevalent over time (Silver et al 2012).

Activity and Participation

Restricted mobility due to lack of suitable wheelchairs, dependence with transfers and lack of aids or independence with daily activities such as dressing and eating were barriers to community reintegration, as identified in one study (Silver et al 2012).

Environmental Factors

Physical: Inaccessible housing and transportation, particularly compared to the hospital or spinal unit where the individual with SCI had come from, was identified as a barrier in three studies (Dickson et al 2011, Kuipers et al 2011, Silver et al 2012). A study based in the USA (Silver et al 2012) reported that this factor can result in discharge to a nursing facility rather than to home. In the same study, difficulty accessing information and resources regarding housing issues and returning to driving were identified (Silver et al 2012). Lack of finances or insurance to fund general expenses, caregivers, medical specialists or further therapy were also viewed as barriers (Boschen et al 2003, Silver et al 2012, Suddick et al 2009), as were costs for consumables used for dressings or for managing bowel and bladder cares along with equipment such as wheelchairs and cushions (Boschen et al 2003). Inability to return to work due to physical inaccessibility of workplaces was identified as an additional barrier to community reintegration, along with longer timeframes required by the individual to get ready for work, and health complications that can impact time available to work (Boschen et al 2003, Silver et al 2012).

Social: A lack of support from family and friends who struggle to cope with the huge change in circumstances of their loved one, as well as negative attitudes (those that were patronising or that caused a sense of inferiority) from individuals within society at large were identified as barriers in three studies (Boschen et al 2003, Dickson et al 2011, Suddick et al 2009). In addition, a lack of psychological support leading to low mood and depression was described, particularly at the time of transition from the rehabilitation unit to home (Dickson et al 2011, Suddick et al 2009). One study identified that attitudes of health professionals could compromise gains in independence when they were perceived to limit control and choice in the rehabilitation process for the individual with SCI, resulting in a sense that intervention was not client-centred (Boschen et al 2003). A different study reported that health professionals expected a certain level of function depending on the level of SCI and did not expect the individual to move beyond this to achieve more (Suddick et al 2009). The same study also identified that participants felt they were expected to be “positive in rehab” at all times; and felt not to be allowed space and time to mourn “this awful thing that has happened to you” (Suddick et al 2009, p 538).

Personal Factors

The transition from the rehabilitation hospital or spinal unit to home was reported to result in feelings of isolation (Dickson et al 2011, Suddick et al 2009). The spinal unit provided a sense of camaraderie and shared experience with others who have sustained SCI, but on returning home this sense of belonging and the peer support from being surrounded with others in a similar condition was lost. In addition, there was a personal sense of inferiority and lack of belonging to the community they were once a part of (Dickson et al 2011). Three studies reported a theme of being anxious and not psychologically prepared for returning to home and the community following discharge from the care of the hospital rehabilitation environment (Dickson et al 2011, Nunnerley et al 2013, Suddick et al 2009). Low mood, depression and suicidal thoughts on returning to the community were described (Dickson et al 2011) because of having to adjust to SCI and the struggle to cope in the ‘real world’ with a new sense of self (Nunnerley et al 2013, Suddick et al 2009). One study also described the invasion of privacy and a feeling of being exposed because of having to be dependent on caregivers to assist with personal cares, even to the extent of “when you go to the toilet” (Nunnerley et al 2013, p 1168).

Table 1: Summary of studies included for review

Author (Year)	Purpose	Design	Sample Population	Barriers/Facilitators	Quality
Boschen et al (2003)	Canadian study that examines the factors that influence community reintegration 1-6 years post SCI.	Qualitative arm of a mixed methods study. Focus groups using Grounded Theory.	n=34 71% male 65% tetraplegic 35% paraplegic 41% complete SCI 59% incomplete SCI	Barriers: Pain – barrier to daily activities Health complications Inaccessible housing, transport Return to work – physical and conceptual barriers Inaccessible physical environment Finances Sourcing supplies and equipment Societal attitudes Health professional attitudes – limiting choice/control, rehabilitation not client centred Facilitators: Independence with daily activities Support from family and friends Mentoring from peers Familiar community/neighbours Accessible housing, transport Communication – assistive technology Financial stability	75%
Dickson et al (2011)	Study based in the United Kingdom captures the lived experience of SCI from an individual perspective.	Individual semi-structured interviews. Recurrent themes analysed using IPA.	n=17 All tetraplegic; level of injury C5-C7, at least 1 year post injury 14 males 3 females Mean age=46 (26-62)	Barriers: Loss of fitness post discharge – unable to access fitness equipment Lack of psychological support Other people's reactions – feeling of inferiority Loss of camaraderie returning home from spinal unit Loss of shared experience, peer support Isolation on discharge home Loss of sense of belonging returning home Loss of safety, security returning home Depression, suicidal thoughts Not psychologically prepared for discharge Facilitators: Community resources – social work, physiotherapy, occupational therapy, nursing, psychology	75%
Kuipers et al (2011)	Australian based study which explores the concept of community as described by participants with SCI.	Telephone interviews. Open-ended questions supplied to participants in advance. Thematic analysis.	n= 269 Mean age 43 (20-76) Mean time since injury 16 years 81% male 40% ASIA A Tetraplegia 37% ASIA A Paraplegia 23% incomplete SCI	Barriers: Inaccessibility in the environment Inaccessible transport Facilitators: Relationships Familiarity with home, community Support from neighbours Independence in the community with access, transport	75%

Author (Year)	Purpose	Design	Sample Population	Barriers/Facilitators	Quality
Nunnerley et al (2013)	To investigate the experiences of community (re) integration of people with SCI within 12 months of discharge from a spinal unit in New Zealand.	Qualitative interviews using IPA. Initially via telephone and then face to face interviews.	n=9 7 males 2 females Mean age 36 years (20-55) All tetraplegic (C4-C7) Time since discharge 6.5-10 months	Barriers: Lack of control and reduced autonomy Loss of independence Feeling exposed – invasion of privacy Home environment not accessible like the spinal unit Anxiety about translating skills to adapt to challenges of the community environment Facilitators: Adjustment to SCI; re-establishing self, coming to terms with changed self Hope for recovery Locus of control Confidence to translate skills to community environment	100%
Silver et al (2012)	Use of the ICF to investigate barriers to community reintegration with SCI in the first year post discharge from inpatient rehabilitation. Study based in the United States of America.	Qualitative arm of a mixed methods study Recurrent interactions over a 6 month period via phone or in person done by a navigator with SCI. Followed by focus groups.	n=26 81% male 54% tetraplegic Mean age 40.6 (18-86 years) Less than 1 year post discharge from acute rehabilitation	Barriers: Restricted mobility – lack of suitable wheelchairs, aids for daily living Increasing weakness post discharge Lack of support at home Inaccessible housing Adjusting to returning home, transition to another living situation Lack of financial support for medical specialists, further therapy Access to wheelchair accessible transport Emotional coping Sourcing information, knowledge – housing, transport Dependence for activities of daily living Pain	75%
Suddick et al (2009)	To explore the lived experience of community reintegration in the United Kingdom following SCI.	Semi structured interviews using IPA.	n=7 4 males 3 females 1 tetraplegic 6 paraplegic Mean years since SCI 8.6 (5-12) Participants recruited through sports clubs and activity centres in the community	Barriers: Health professional's expectations – expect a certain level of function depending on injury; expect a constant positive attitude from person with SCI to be constantly engaged in rehabilitation. Lack of rehabilitation post discharge Lack of knowledge in community health professionals Adjustment to SCI Adjustment to leaving the spinal unit on discharge – not prepared Isolation following discharge Attitudes of family/friends Facilitators: Positive attitude Peer mentors Attitudes of family/friends Family supported rehabilitation Voluntary groups valuable for reintegration	75%

Author (Year)	Purpose	Design	Sample Population	Barriers/Facilitators	Quality
Van de Velde et al (2010)	This study from Belgium with individuals with SCI investigates perceptions of what participation means for them on transition from hospital to home.	Individual in-depth interviews using Grounded Theory. (26 interviews resulting in saturation of data).	n=11 Theoretic sampling strategy; male SCI discharged and in transition from hospital to home (2 months post discharge) Age range 25-56 years All paraplegic All married/partner	Facilitators: Sense of control Validation, endorsement Sense of importance, being valued Choosing to do an activity independently Engaging in family/community life without expectations of contributing Engaging in activities in a socio-cultural context	75%

Notes: ICF, International Classification of Functioning, Disability and Health; IPA, Interpretive Phenomenological Analysis; SCI, spinal cord injury

Self-Management Factors

A lack of personal control over the environment and of others in the environment due to physical limitations with SCI was reported in one study (Nunnerley et al 2013). These authors also described how individuals felt they wanted to take some control but were unable to due to limitations placed on them by health professionals. This loss of independence, often due to a required dependence on others for physical assistance, resulted in a sense of powerlessness and reduced self-efficacy (Nunnerley et al 2013).

Facilitators to Community Reintegration Following SCI

Activity and Participation

Independence with functional tasks as part of daily living enabled community reintegration (Boschen et al 2003). Having choice over how to do an activity, engaging in family or community life and participating in activities in a socio-cultural context such as within the work environment (regardless of whether this was paid or voluntary) were described as different aspects of participation which facilitated community reintegration (Van de Velde et al 2010).

Environmental Factors

Physical: Having accessible housing, communities and transport facilitated reintegration (Boschen et al 2003, Kuipers et al 2011). Financial resources provided stability and enabled a level of control and independence (Boschen et al 2003). Access to health professionals and psychological services were perceived to provide valuable support in the transition process (Dickson et al 2011). Assistive technology that allowed effective communication with family and friends along with access to information and resources was deemed important (Boschen et al 2003). Lastly, participating in community based voluntary groups provided constructive activity for rehabilitation and reintegration to “get on and do stuff” (Suddick et al 2009, p 539).

Social: Relationships with family, friends and the local community were identified as providing valuable support to facilitate community reintegration (Boschen et al 2003, Kuipers et al 2011, Suddick et al 2009). One study reported that those who described their community in terms of relationships were generally more positive about their community than those who described it physically (Kuipers et al 2011). Familiarity with the home and neighbourhood environment meant that individuals had knowledge of the community they were returning to (Boschen et al 2003, Kuipers et al 2011). Along with this, mentoring from peers was seen to provide support to bridge the gap from the inpatient setting to the community setting (Boschen et al 2003, Suddick et al 2009).

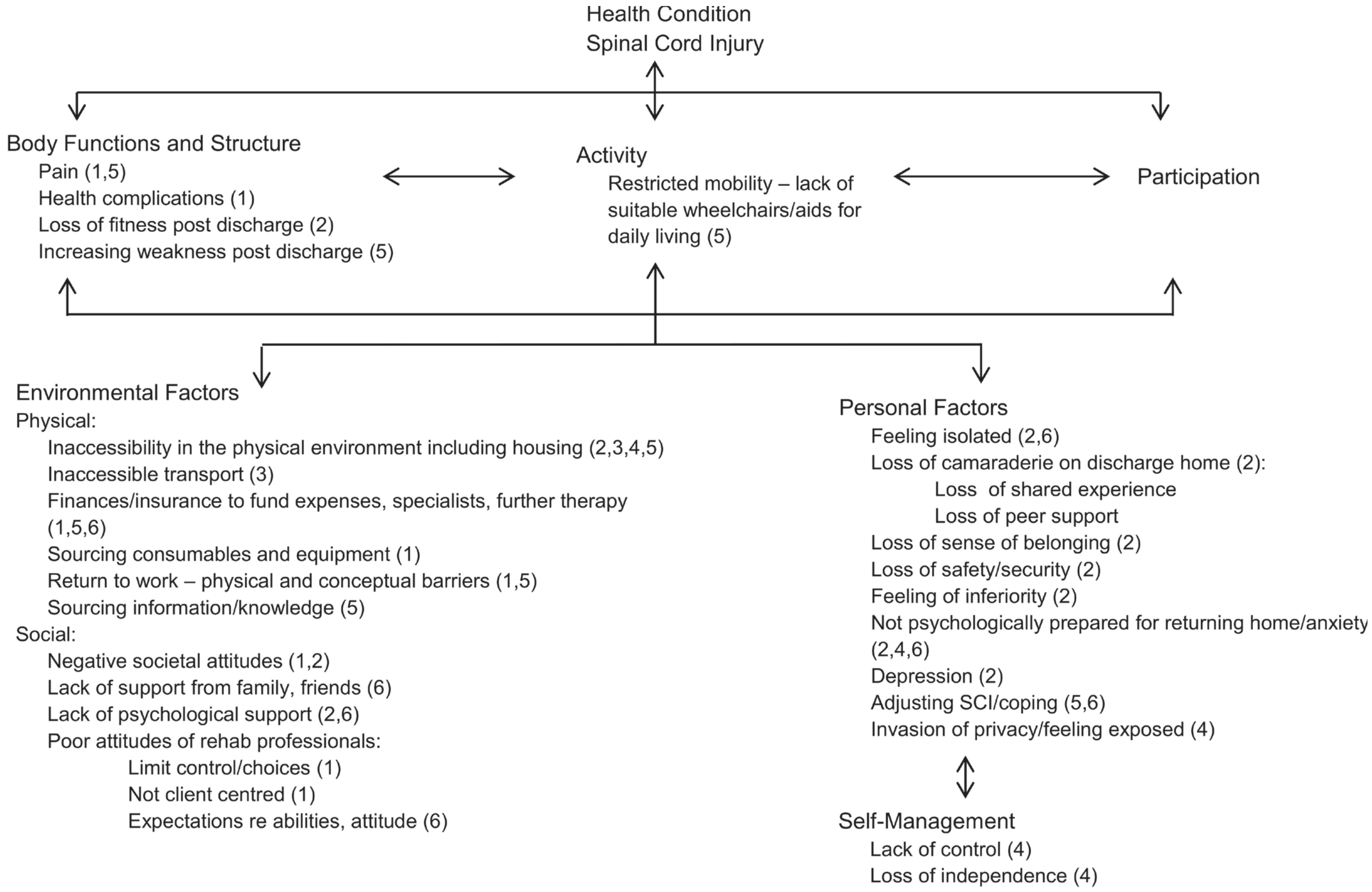
Personal Factors

Adjustment to SCI was reported in the studies with similar strong descriptors, ‘rebuilding’ or ‘reframing life’ (Boschen et al 2003), ‘re-establishing self’ and ‘coming to terms with a changed self’ (Nunnerley et al 2013). Participants in one study described physical, emotional and spiritual changes as a result of their injury. This study also identified a hope for recovery as a facilitator, particularly in the first two years following SCI. However, it also identified that while this hope fosters participation in physical rehabilitation, it can hinder other aspects of reintegration such as focussing on work or other leisure pursuits (Nunnerley et al 2013). A positive attitude was perceived as being a key to facilitating smoother transition to the community (Suddick et al 2009), while a sense of importance and being valued by friends, family and the wider community provided a sense of belonging (Van de Velde et al 2010).

Self-Management Factors

Having a sense of control through independence with tasks or validation with achievement was deemed important in the coping process following SCI; this fostered autonomy and participation (Nunnerley et al 2013, Van de Velde et al 2010). Restoring independence and the confidence to adapt skills learnt in the hospital or spinal unit setting to home facilitated reintegration (Suddick et al 2009, Nunnerley et al 2013); with a participant in one study commenting “you can just do it however you want” when referring to doing activities in the

Figure 3: Barriers to community reintegration following spinal cord injury incorporated into the ICF framework. Model adapted from Mulligan et al (2012)



Notes: Study identifiers appear in parentheses: (1) Boschen et al (2003), (2) Dickson et al (2011), (3) Kuipers et al (2011), (4) Nunnerley et al (2013), (5) Silver et al (2012), (6) Suddick et al (2009), (7) Van de Velde et al (2010)

home environment as compared to the hospital environment (Nunnerley et al 2013, p 1167). Peer mentoring and modelling along with validation and endorsement by peers and others facilitated adjustment and transition to the community (Boschen et al 2003, Nunnerley et al 2013) while also improving self-efficacy and belief in one's self.

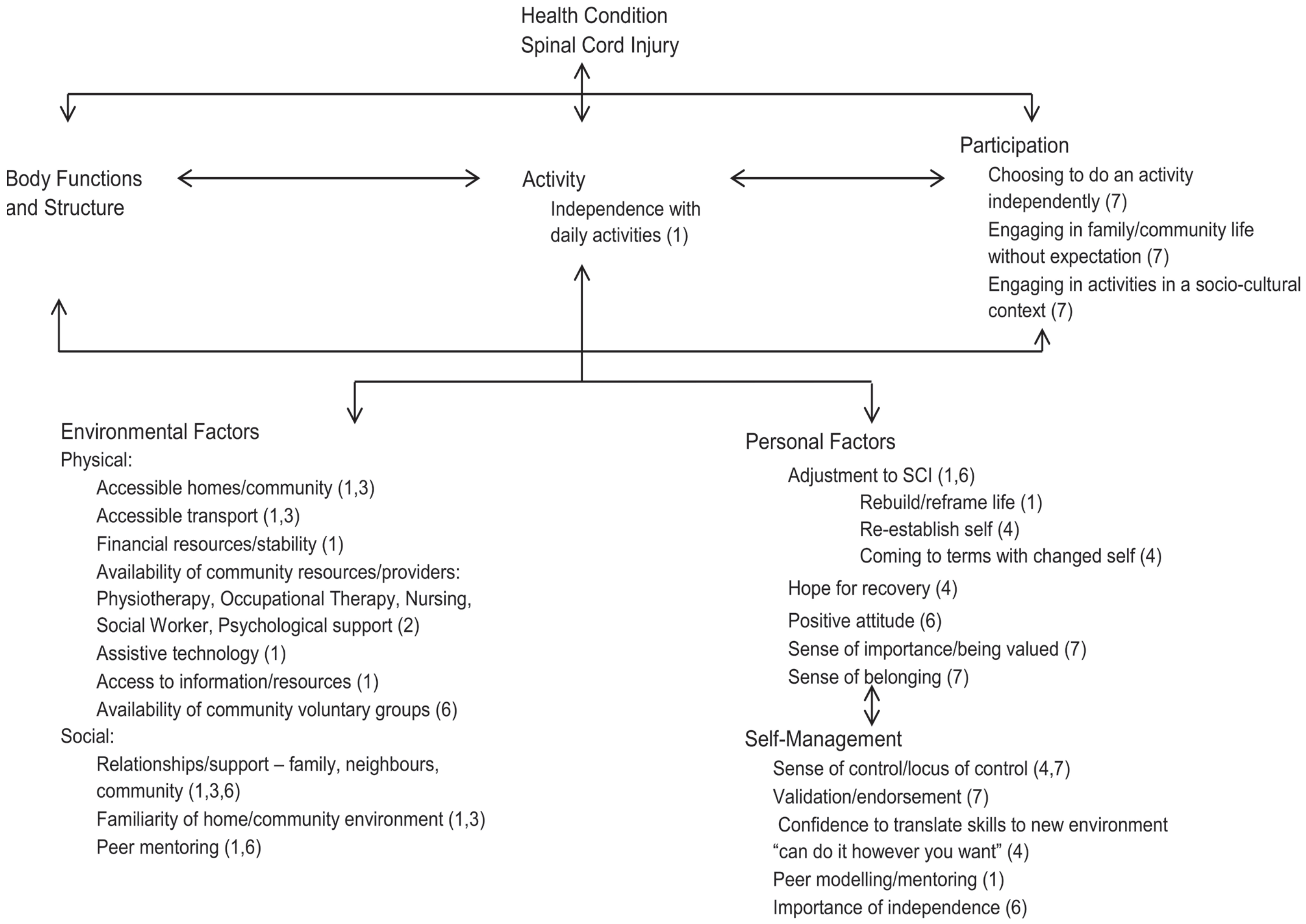
DISCUSSION

This review examined the barriers and facilitators to community reintegration following SCI as reported within the body of qualitative literature. While only a small number of studies were suitable for inclusion, the findings of these qualitative studies reflect the multifactorial components that hinder or promote reintegration. By categorising the barriers and facilitators into the ICF framework of domains, it was most apparent that contextual influences from environmental and personal factors (as opposed to factors related to body structure or function or activity level) predominated as both facilitators and barriers. Factors related to self-management (as a subset of personal factors) provided the warranted emphasis on the importance of self-efficacy in the day to day management of an individual with SCI. Personal statements reported in qualitative studies provided unique and thought-provoking insights that cannot be revealed from quantitative data.

The studies in this review came from a range of countries with similar political and economic development as New Zealand meaning they can provide insight for health professionals working in community rehabilitation services within New Zealand. However, there are distinct influences in the New Zealand environment that affect community participation following SCI which require consideration (Sinnott et al 2010). Firstly, we have the Accident Compensation Corporation (ACC) that provides a "no-fault personal injury cover to all New Zealand residents and visitors to New Zealand" (Accident Compensation Corporation 2014). The role of the ACC is within injury prevention, and treatment provision with an emphasis on return to everyday life. The ACC provides insurance cover for individuals who sustain SCI in New Zealand through injury and the Ministry of Health provides cover for those who acquire SCI through non-injury related means. The implications of this situation are examined in more depth later in the discussion.

Secondly, New Zealand identifies itself as a bi-cultural nation with Māori as the indigenous people. Statistics reveal that Māori have higher rates of incidence of SCI than New Zealand Europeans and that people of Pacific Island origin have an even greater incidence of SCI than Māori (2.4 times greater than New Zealand Europeans) (Derrett et al 2012). He Korowai Oranga is a health and disability strategy for Māori developed through the Ministry of Health, most recently updated in June 2014 (Ministry

Figure 4: Facilitators to community reintegration following spinal cord injury incorporated into the ICF framework. Model adapted from Mulligan et al (2012)



Notes:Study identifiers appear in parentheses: (1) Boschen et al (2003), (2) Dickson et al (2011), (3) Kuipers et al (2011), (4) Nunnerley et al (2013), (5) Silver et al (2012), (6) Suddick et al (2009), (7) Van de Velde (2010)

of Health 2014). This strategy describes the vision of Pae ora or healthy futures for Māori and includes three elements; mauri ora (healthy individuals), whānau ora (healthy families) and wai ora (healthy environments). These concepts of health, family and environment are certainly relevant to the factors that facilitate community reintegration following SCI identified in this review study. The health and disability strategy for Māori could therefore provide a theoretical framework to enhance or facilitate community reintegration for people with SCI if all of the three elements were addressed. Of interest is that this kind of framework also dovetails with the findings of the review by Gargaro et al (2013). Gargaro et al (2013) identified that the health of the individual with SCI was important, as was support from family and friends and an accessible and inclusive environment in which people with SCI felt welcome, valued and able to contribute. However, given the higher incidence of SCI in the Māori and Pacific Island populations in New Zealand, further exploration of the experience of community reintegration following SCI for these individuals is warranted to highlight specific issues they may face.

Health complications that individuals can be predisposed to following SCI can inhibit or interrupt community reintegration (Boshen et al 2003, Silver et al 2012). However, the review by Gargaro et al (2013) identified gaps in research pertaining to bowel and bladder function, pain and sexual health and their impact on community reintegration. Without access to ongoing appropriate resources or therapy there can be a loss of strength and fitness originally gained while undergoing initial inpatient rehabilitation leading to reduced or restricted mobility and participation in activities (Dickson et al 2011, Silver et al 2012). Such findings may be relevant especially for individuals returning to rural areas or smaller towns in the New Zealand environment where access to resources and therapy may be more limited than that which is available in cities and larger towns. Careful planning and collaboration with suitable therapy providers would therefore be prudent.

Coming to terms with having an SCI is a lengthy process. When returning to their communities, individuals with SCI are faced with adjusting to a familiar environment but with a changed self (Boschen et al 2003, Nunnerley et al 2013). This appears to lead to a sense of insecurity and of not being psychologically ready to return home (Dickson et al 2011, Nunnerley et al 2013, Suddick et al 2009). Feelings of inferiority or being viewed as different by others in the community impacts an individual's view of self (Boschen et al 2003, Dickson et al 2011, Suddick et al 2009). While a sense of hope for recovery can foster commitment to physical recovery it can defer focus on returning to other activities such as work or leisure pursuits (Nunnerley et al 2013). This review study has provided insight into key aspects that encapsulate what re-establishing self implies, that this is having a sense of control, confidence to translate skills learnt to the home environment, regaining independence and receiving validation from family, friends and health professionals about being able to manage one's own decisions and being the same person even though living with a changed physical body (Boschen et al 2003, Nunnerley et al 2013, Suddick et al 2009, Van de Velde et al 2010). Through these, self-efficacy is fostered which leads to the ability for an individual to manage his or her life (Geyh et al 2012).

Suitably modified and accessible homes, adequate transport, wheelchairs, and equipment and supplies for showering and toileting are physical supports that are essential and could reasonably be expected when someone returns home after an SCI (Dickson et al 2011, Kuipers et al 2011, Silver et al 2012). Access to ongoing rehabilitation is often required to maximise function, independence and participation in chosen activities (Dickson et al 2011, Kendall et al 2003). Rehabilitation can support access to information, resources or services that assist with returning to the workforce (Dickson et al 2011). Access to financial support is necessary for daily expenses and to fund housing modifications, equipment and therapy (Boschen et al 2003, Silver et al 2012, Suddick et al 2009). All of these contribute to facilitating community reintegration following SCI. However, disparity of funding through benefits or insurance schemes between countries will affect the level of support that is available from country to country. Even within New Zealand there is disparity between those funded through the ACC and the Ministry of Health; anecdotally individuals covered by ACC have greater financial resources for equipment, housing modifications and compensation for loss of earnings if unable to work. Further research to examine community reintegration for individuals with SCI funded under these two schemes to highlight and address disparities is warranted.

The importance of relationships and support from family, friends and the community was a recurring aspect for successful reintegration identified in this review. One study in particular identified the importance of a key figure (whether they be a family member, friend or health professional) as integral in facilitating community reintegration (Boschen et al 2003). Perhaps the inclusion of family and friends in the rehabilitation process could provide a better understanding of the impact and requirements for someone with an SCI. In addition, psychological support for the injured individual and their family would provide the opportunity to discuss adjustment and the challenging transition to returning home to local communities.

This review identified that the attitudes of health professionals impact on community reintegration; enabling an individual with SCI to have control in the rehabilitation process and choice with goals and direction via a client-centred approach facilitates this. One study identified that an expectation of health professionals working with spinal cord injured individuals was that their patients would be constantly positive and engaged in their rehabilitation; not allowing space for natural feelings of sadness and grief over their injury (Suddick et al 2009). Understanding this to be a potential barrier for their clients could help the health professional ensure that their support and care is appropriate and centred around their client's needs.

The feeling of disconnect on returning to the community following an SCI was evident in this review study. Loss of the shared experience and sense of belonging that individuals with SCI had with their peers at the spinal unit led to feelings of isolation following discharge home. Therefore, having a sense of belonging, of being a valued member of the family, community, school or workforce seems important for reintegration and participation in community. However, connecting with others in the community who have experienced SCI could be beneficial as well, as it is these individuals who understand the process of returning home and the challenges that can be encountered. This is supported in the review by Gargaro et al (2013) which comments on the importance of peer support and social networking in transition to the community. There are programmes and organisations in New Zealand, and indeed other countries, that seek to support those with SCI along with their families and friends and provide opportunities for networking and sharing of information, experiences and knowledge (for example, the New Zealand Spinal Trust or the Spinal Injuries Association in the United Kingdom). Further research would be beneficial to discover how effective these are perceived to be for individuals with SCI.

Clinical Implications

The findings from this review present implications for clinical practice by health professionals working in the community with individuals who have an SCI. These are:

1. *Re-establishing self:* Understanding that the process of adjustment to a changed self after SCI will take time and requires empathetic support. Access to psychological support for both the injured individual and family may benefit this process.
2. *Client centred:* Allowing the individual with SCI control and choice in their rehabilitation and return to community with health professionals providing appropriate support. The level of support will shift over time but health professionals should permit the individual to drive the process.
3. *Support:* Including family and friends in the rehabilitation process can facilitate reintegration for individuals with SCI into their communities. The support and attitudes of health professionals can also have a significant impact. Health professionals should therefore be sensitive and reflective in their practice as to whether they are doing the best they can to be inclusive and empathetic towards an individual with SCI and his/her family and support network.
4. *Connections:* Facilitating the linking up with others who have sustained SCI and enabling and encouraging utilisation of resources and organisations that facilitate these connections.
5. *Access:* Facilitating the process of timely and appropriate delivery of services whether it is housing modifications,

equipment, suitable transport or therapy. This requires close collaboration between the individual with SCI, the funding agency and health professionals from within both the acute spinal unit and community settings.

6. *Re-evaluation:* Barriers and facilitators to community reintegration can change over time. What may not be a barrier initially may become more of an issue later. For example, while pain was not a strong theme in the qualitative studies reviewed here, it has been identified as a significant factor impacting community reintegration in other studies, becoming more prevalent as an issue with time following SCI (Donnelly and Eng 2005, Gargaro et al 2013). Therefore, health professionals need to re-evaluate a client's situation on a regular basis.

The limitations of this review have been considered. Only a small number of studies met the inclusion criteria and the number of participants in qualitative studies tends to be small. Apart from one study which had 269 participants, the remaining studies had between 7 and 34 participants; so caution is required in applying the results to the wider population. In addition, participants in the types of studies included in this review were typically volunteers and are therefore not necessarily representative of the wider SCI population. Nevertheless, the review studies did encompass a wide age range, both sexes and a wide range of severity of injury, all of which make the findings more relevant to the population with SCI overall. This review identified similar themes to the results of quantitative studies that have investigated community reintegration following SCI (for example see Gargaro et al 2013). This suggests that the findings of this review of qualitative studies may indeed be representative of the population with SCI as a whole. Lastly, although the studies included in this review cannot be applied to a worldwide population, they are nevertheless reflective of the experiences of people with SCI in developed countries and therefore have relevance to the New Zealand context which is the focus of this review.

CONCLUSION

In this literature review, the ICF framework with the addition of a self-management component was used to identify and structure barriers and facilitators to community reintegration following SCI. The environment and personal factors predominated, with maintenance of health, accessibility to the built environment and health services, re-establishing self and community connections being strong facilitators to reintegration. The challenge for health professionals working in the community with individuals with SCI is to be client centred and inclusive of the client's family, community and other rehabilitation providers to ensure the individual's needs are suitably met.

KEY POINTS

- The ICF framework of domains provides a useful tool to examine the barriers and facilitators to community reintegration; with the addition of self-management to further define personal factors.
- The environment and personal factors predominate as influences on community reintegration following SCI, with health and wellbeing, accessibility, re-establishing self, support and connections within the community being strong themes.
- The challenge for health professionals working in the community with individuals with SCI is to be client centred and inclusive with their families, communities and other rehabilitation providers to ensure the individual's needs are suitably met.

FUNDING SOURCE

No financial support was received for this study.

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The therapeutic positional preferences of pregnant women

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ABSTRACT

The study sought to identify the therapeutic positional preferences held by pregnant women at different stages of their pregnancy. This was a longitudinal, observational study on 13 healthy pregnant women. Participants were assessed at 20-22 weeks gestation in a face-to-face session where anthropometric data was gathered. Participants were then placed in each of three treatment positions (side lying, quarter turn from prone and forward leaning sitting) typical of those used in physiotherapy management. The positions were presented to the participants in random order and they were asked to rank their least to most preferred positions. Participants verbally repeated the task of ranking their positional preferences by telephone interview at 26, 32 and 38 weeks of their pregnancy. Photographs of the three treatment options had been issued to the participants to serve as a prompt prior to the commencement of the interview sessions. The results showed that the positional preferences are distinct and varied throughout pregnancy, and that side lying was the most preferred therapeutic position of the three options. Sitting was the second choice for most women and was increasingly favoured as pregnancy progressed. Pregnant women experiencing pain consistently preferred side lying over other positional options.

Ashby JF, Johnson GM (2015) The therapeutic positional preferences of pregnant women. New Zealand Journal of Physiotherapy 43(3): 86-92. doi 10.15619/NZJP/43.3.03

Key words: positions, pregnancy, patient perspective, preference

INTRODUCTION

Pregnancy related low back or pelvic pain has been recognised as a medical entity since mentioned in the 4th century BC by Hippocrates. The topic has also been researched widely in the last century (Kanakaris et al 2011) and there is now recognition that the conditions of pregnancy-related pelvic girdle pain (PGP) and pregnancy-related low back pain (PLBP) are distinct clinical entities under the generic framework of pregnancy related lumbo-pelvic pain (PRLPP) (Wu et al 2004). Approximately 25% of women seek help for PRLPP during pregnancy, with 5% of women continuing to seek treatment at the postpartum phase (Wu et al 2004).

Research regarding PRLPP has predominantly focussed on the epidemiology (Ostgaard et al 1991, Robinson et al 2010, Wu et al 2004) and assessment (Gutke et al 2010, Mens et al 2001) and there is still a need for further evidence as to its optimal management (Pennick and Liddle 2013, Vermani et al 2010, Vleeming et al 2008). Further evidence on management of PRLPP is needed to ensure that the problems do not become chronic leading to reduced productivity and reduced activity levels, and potentially increasing costs to health systems.

Ligamentous laxity, weight gain and hyperlordosis are common physical changes associated with pregnancy (Borg-Stein et al 2005) and physiotherapists must adapt their usual practice accordingly. For example, when positioning women in pregnancy prior to undertaking manual therapy the physical changes of increased abdominal girth must be acknowledged and steps taken to eliminate risk and optimise patient comfort. However, information regarding patient-level choices of comfort and positions applicable to physiotherapy over the three trimesters of pregnancy is lacking. Knowledge about patient preferences in body position during pregnancy will assist physiotherapists to deliver more comfortable and safer therapy options, and thereby potentially improve patient outcomes.

Many studies investigating body position in pregnancy have been conducted with the intention of informing the medical profession for anaesthetic or surgical interventions at full term of pregnancy and around the time of delivery. Collectively, there is evidence that side lying (preferably left side lying) is the optimal position in the later stages of pregnancy from a physiological and haemodynamic perspective. (Almeida et al 2009, Armstrong et al 2011, Bamber and Dresner 2003, Ellington et al 1991, Kienzl et al 2014, Tamas et al 2007). The supine position causes occlusion of the inferior vena cava and aorta from the gravid uterus (Ellington et al 1991, Kienzl et al 2014), and in the side lying position, maternal cardiac output, renal excretion and hormonal changes (Almeida et al 2009, Bamber and Dresner 2003) are all improved. Sitting is known to be less beneficial than side lying for maternal cardiac index measurements (Armstrong et al 2011). Foetal responses are also improved when the mother is in left side lying compared with the supine lying position (Tamas et al 2007).

Physiotherapists may see pregnant patients at any stage of pregnancy, often well before full term, and so there is a need to investigate their therapeutic positional choices at various stages of pregnancy. A good understanding of the risks and benefits of various positions in pregnancy appropriate for treatment is imperative to ensure that physiotherapists are able to inform the patient and discuss the available options, then come to a mutually agreeable decision. The patient-led decision making process is considered to be vital in other facets of obstetric care (Dugas et al 2012). Although this is extended into the physiotherapy field, there is little information on views and opinions regarding pregnant women's preferences of possible treatment position options. Therefore, the aim of this study was to identify the therapeutic positional preferences of pregnant women at four different stages of pregnancy. These stages were selected to represent a longitudinal capture of possible changes throughout pregnancy rather than any distinct physical or physiological stages of pregnancy.

METHODS

Participants

Thirteen pregnant women were recruited by advertising in local midwifery clinics, physiotherapy practices and hospital departments, and by direct referrals from two maternity clinics in suburban Christchurch. Women were included in the study if they had reached 20 weeks gestation of a normal pregnancy (as determined by their charge midwife). Exclusion criteria were women with a high risk pregnancy, a verified diagnosis of spinal problems or serious musculoskeletal disease and/or a history of spinal fracture, neoplasm or spinal or pelvic surgery. This study was approved by the Upper South B Regional Ethics Committee (Authorisation reference URB/11/EXP/042). Participants were provided with both verbal and written information on the study, as well as providing written consent prior to entering the study.

Procedure

Initial Assessment

An assessment was scheduled at a convenient time for each of the participants no later than 22 weeks gestation. Baseline information of age (years), weight (kg) and height (cm) along with details regarding the current pregnancy, and previous pregnancies and births was gathered. The history of current and previous back pain was documented and their favoured sleep position was established. Participants also completed a body chart indicating location of their current back pain (if any). The Oswestry Low Back Pain Disability Questionnaire (Fairbank et al 1980) was used to evaluate any physical disability attributable to back pain. The Pelvic Girdle Questionnaire (PGQ) (Stuge et al 2011), which is a condition-specific measure of disability due to PGP, was also completed in order to differentiate symptoms unrelated to this condition. Participants were assessed with the Active Straight Leg Raise (ASLR) Test (Mens et al 2001). The ASLR Test was chosen over other provocation tests on the basis of its ability to differentiate individuals with PGP from healthy subjects (Mens et al 2001) along with the demonstration of it having sound clinimetric properties in pregnant women (Mens et al 2001, Roussel et al 2007). However, it is worthy of note that the ASLR Test does not exclusively test for PGP, and can be predictive of low back pain conditions, such as possible lumbar instability (Rabin et al 2013).

Operational definitions were determined for each of the three positions offered as treatment options for the purpose of this study: sitting leaning forwards (Figures 1A & B); side lying (Figure 1C); quarter turn from prone (Figure1D). The participants were then placed in these three therapeutic positions in randomised order. The random order was determined using an online tool (www.random.org). The positions were each sustained for three minutes duration and on completion of the trial, participants ranked the positions in order of their least to most preferred position. Photo cue cards of the positions were used to assist participants with the ranking. The participants were also invited to justify their ranking choice of positional preference. It was not stipulated at any stage whether the side lying and quarter turn from prone positions should be left or right sided as this was decided by individual preference. Documentation of the side selected was not undertaken.

Follow-up phase

Follow up telephone interviews were made at 26, 32 and 38 weeks gestation. Information was gathered through questioning on the participant's current preferred sleeping position and any new additional onset of pain. The interview questions were not formally standardised, however specific information was gathered and recorded on a data collection sheet so as to minimise misinterpretation of the information being gathered.

The participants were asked to trial the positions at home (there was no randomisation, nor standardised time spent in each position at this stage) and to again rank them in order of preference, stating their reasons for their preferences. In order to make this easy for the participants to carry out independently the same photo cue cards were used, which had been given to each of the participants at their preliminary data collection session to serve as a prompt for the telephone interview.

RESULTS

Participants

Thirteen participants volunteered for the study, mean age 30, standard deviation (SD) 3.1 years (range 26-38 years) with a mean height of 164 cm (SD 6.2 cm) and mean weight 63.5 kg (SD 6.5 kg). Parity ranged from 1 to 5 children with a mean parity of 2 (SD 1.3) and mode of 1. All participants stated their ethnicity to be New Zealand European.

The opinions of all 13 participants regarding their positional preference were gathered on four separate occasions excepting on the last session (38 weeks of pregnancy) where four of these participants were lost to the study as they had delivered their (healthy) babies slightly prematurely. There were no reported adverse problems associated with any of the participants' involvement with the study.

Eight participants stated they were pain free, three reported PGP and two reported lumbar pain at the 20 week recruitment stage. Four of the seven women of the multigravida status group had experienced PRLPP previously. Eight participants registered a score on the Oswestry questionnaire and PGQ ranging from 0-13/50 and 0-65/100 respectively. The individual Oswestry and PGQ scores are shown in Table 1.

The ASLR Test (Mens et al 2001) was self-rated as negative for all participants with the exception of one individual who reported a slight difficulty in raising the legs with the test. The examiner noted three participants who had reported PGP at 20 weeks had a slight difficulty (scoring 1/5) with the ASLR test with minor trunk rotation. In one of these cases, the participant's PGP had resolved by the 26 week stage, with the other two participants continuing to have PGP throughout their pregnancy.

Table 1: Baseline (20 weeks gestation) individual and group mean and standard deviation (SD) scores for both the Oswestry low back pain and pelvic girdle questionnaires (n=13)

Participant number	Owestry Low Back Pain Questionnaire Score out of 50	Pelvic Girdle Questionnaire Score out of 100
1	0	0
2	8	19
3	13	65
4	0	4
5	3	1
6	0	0
7	2	8
8	0	0
9	0	9
10	0	30
11	0	0
12	0	0
13	2	7
Mean (SD) score	2.15 (3.98)	11.00 (18.54)

Therapeutic positional preferences

At 20 weeks as a group, the participants' most preferred position was side lying (69%, n= 9) with only one participant ranking this position to be their least preferred option (Figure 2). The least preferred position for all other participants was that of quarter turn from prone (54%, n= 7) though one participant determined this to be her most preferred position (Figure 3).

At the second recording phase (26 weeks) the participants became more polarised in their ranking with the quarter turn from prone increasing in both the least and most preferred selections (Figure 3). Side lying remained the most favoured position at 26 weeks (Figure 2).

At 32 weeks of pregnancy side lying was ranked as the first choice by 54% (n=7) of participants (Figure 2). Conversely, sitting increased in popularity as equally likely to be chosen as first or second choice with five participants respectively (Figure 4). Quarter turn from prone remained unpopular being the least preferred position choice for the majority of participants (Figure 3).

None of the participants in the final stage of data collection (38 weeks) chose quarter turn from prone as their preferred therapeutic position (Figure 3). Here, side lying was the most preferred position at 67% (n=6) for first choice (Figure 2). Sitting was found to be the most favoured position for three participants, and also the least favoured position for another four participants (Figure 4).

Overall, 12 of the 13 participants had changed their preferences at some stage of their pregnancy. The one participant who did not change her preference throughout was not assessed at the 38 week stage due to an early delivery.

Reasons for position choice rankings

Side lying was deemed to be the most comfortable and relaxing position for those participants who ranked this to be their preferred position. However at the 32 week stage there were negative comments of increasing back and pelvis pain, discomfort due to the position of the foetus, and shortness of breath when adopting the side lying option, therefore making the sitting position, initially not deemed to be as relaxing, a more preferred option. By 38 weeks side lying was the outright preferred position again due to

Figure 1A: Sitting leaning forwards: Participant sits with knees apart and upper body supported with arms on a raised table or plinth, keeping the back straight.

Figure 1B: Sitting astride a chair: Participant sits astride a chair in a leaning forward position while supporting the upper body on the back of the chair, and keeping the back straight.

Figure 1C: Side lying: Participant in side lying with bilateral hip and knees flexion separated by a pillow placed between the knees.

Figure 1D: Quarter turn from prone: Participant lies as far into prone as possible with the upper knee and hip flexed and the lower leg straight. The lower arm should be behind the trunk in this position.

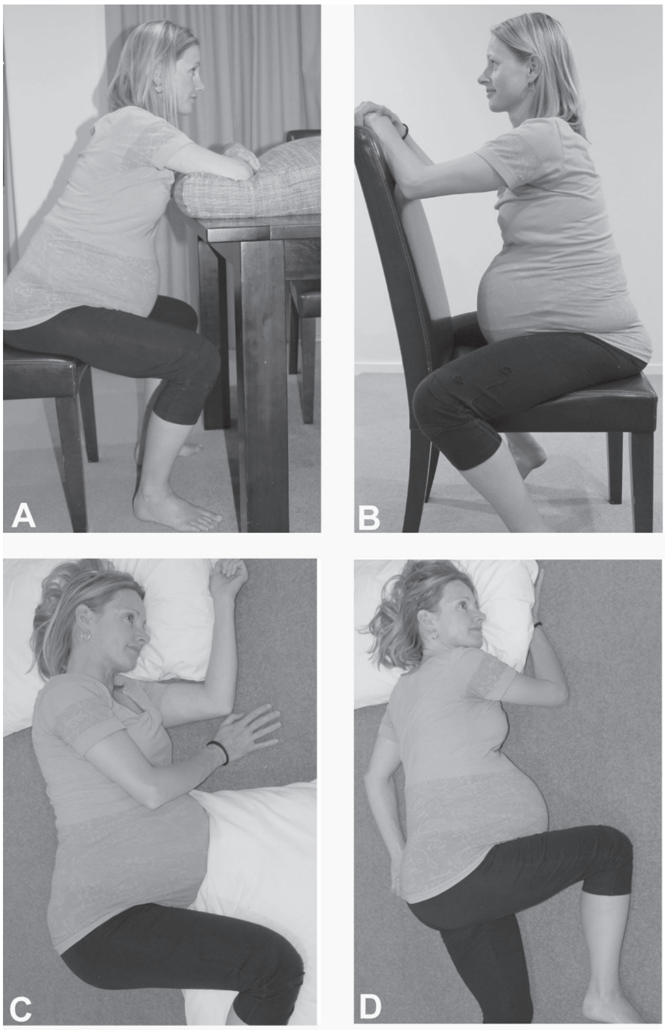


Figure 2: Side lying rankings as the "preferred therapeutic position" at four different stages of pregnancy.

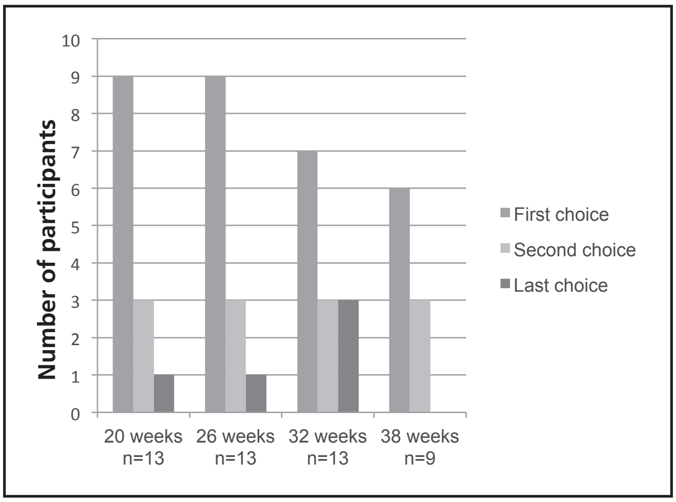


Figure 3: Quarter turn from prone rankings as the "preferred therapeutic position" at four different stages of pregnancy.

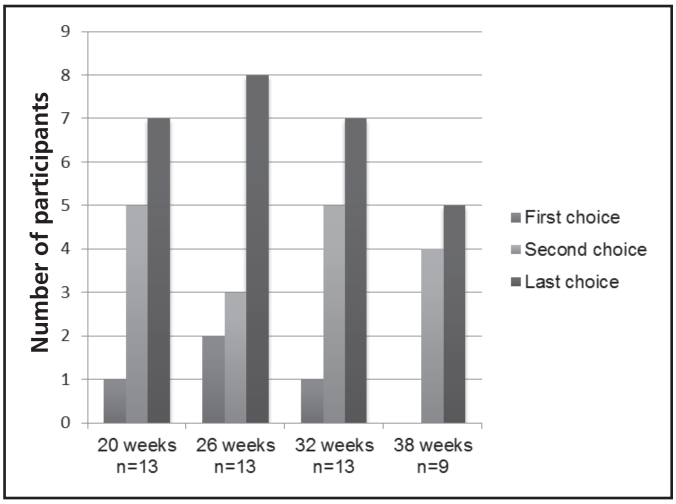
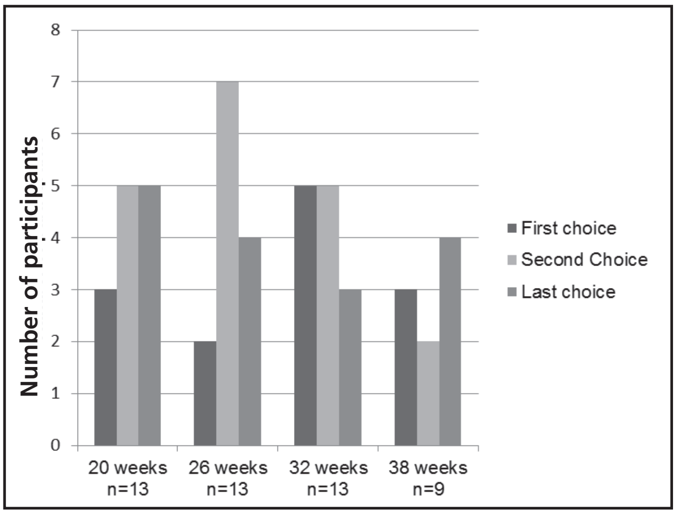


Figure 4: Sitting rankings as the "preferred therapeutic position" at four different stages of pregnancy.



feelings of increased comfort in this position, and sitting became less desirable due to the low position of the foetus.

Although quarter turn from prone ranked the least preferred position in all stages of pregnancy the participants who preferred it at the 20 week stage of pregnancy found it to be supportive and similar to their sleeping position. It was suggested that altering the underneath arm position would increase the comfort of this position.

The presence of pain

The participants' pain status results show an increase in the prevalence of PRLPP throughout pregnancy (Table 2). For ease of collation those participants reporting a combination of lumbar and PGP were assigned to the PGP group. At 26 weeks two participants had experienced flu-like symptoms and found it difficult to specify the nature of their pain.

Five of the participants stated they had pain at the 20 week recruitment stage, three of these had PGP. One of the participants with PGP preferred side lying until 38 weeks when sitting became more comfortable. Another participant with PGP preferred the sitting position throughout pregnancy until 38 weeks when the baby's position caused discomfort in sitting and therefore side lying was preferred. The third participant with PGP preferred side lying throughout her pregnancy to 32 weeks, however the 38 week data were not collected due to early delivery of the baby. Overall, side lying was the preferred position for those women with lumbo-pelvic or thoracic pain as shown in Figure 5.

DISCUSSION

This study aimed to identify the therapeutic positions preferred by pregnant women at different stages of their healthy pregnancies, to address the existing lack of information regarding maternal comfort applicable to physiotherapy treatment positions. The results showed that side lying was the overall preferred position throughout pregnancy in this group of pregnant women, including those experiencing pain. The sitting position was the second most preferred position and also tended to be more popular in the early part of the third trimester of pregnancy during the time of their pregnancy when the women may have been experiencing more discomfort or pregnancy-related pain. The option of quarter turn from prone was the least preferred position at all stages of pregnancy. A variation of the quarter turn from prone position is suggested as an acceptable alternative, whereby the lower arm is placed forward from the body if rotation of the thoracic spine is considered to be acceptable to the woman receiving treatment and, if it is appropriate for the therapeutic intervention.

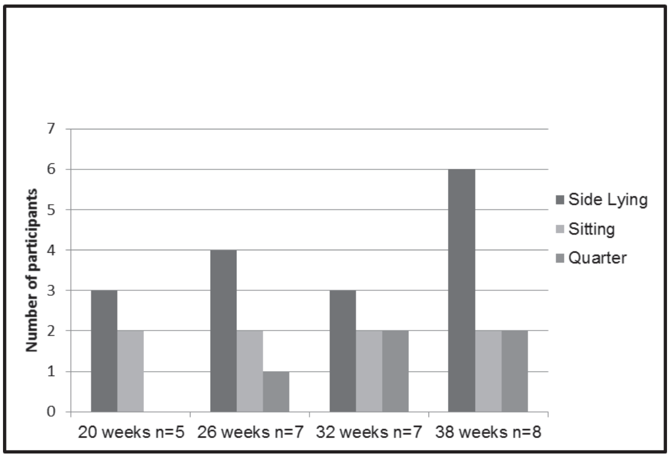
The results in this study indicate that side lying is the preferred therapeutic position choice and these results correlate well to the physiological changes taking place over the duration of pregnancy. In the side lying position, the gravid uterus is able to release compression of the inferior vena cava and aorta, which advantageously improves cardiac output and consequently, renal perfusion (Almeida et al 2009, Bamber and Dresner 2003). Consequently, there is a consensus that side lying is recommended for physiological reasons as the position of

Table 2: Prevalence and classification of participants experiencing pain at four stages of pregnancy

	20 weeks (n=13)	26 weeks (n=13)	32 weeks (n=13)	38 weeks (n=9)
Number of participants reporting pain	5	7	7	8
Lumbar pain	2	2	2	1
Positional preference for lumbar pain	Side (1) Sitting (1)	Side (1) Sitting (1)	Side (1) Quarter turn (1)	Side (1)
Pelvic girdle pain	3	4	4	3
Positional preference for pelvic girdle pain	Side (2) Sitting (1)	Side (3) Sitting (1)	Side (2) Sitting (2)	Side (3) Sitting (2)
"Other pain"	0	1	1 (rib)	2 (rib)
Positional preference for "other pain"		*Quarter turn from prone (1)*	*Quarter turn from prone (1)*	*Side (2)*

Notes: Positional preference noted as the (number of participants selecting each position) as their first choice for each type of pain

Figure 5: Position preferences for participants with pain at four different stages of pregnancy.



choice for surgical and medical procedures at the latter stages of pregnancy (Almeida et al 2009, Armstrong et al 2011, Bamber and Dresner 2003, Ellington et al 1991, Kerr et al 1964).

Lying flat positions can create a feeling of shortness of breath in women in pregnancy due to the growing foetus. Similarly, reflux or dyspepsia can become a problem when lying flat. Heartburn symptoms may be due to hormonal changes in the body causing oesophageal sphincter relaxation or physical pressure on the stomach allowing acid reflux into the oesophagus (Keller et al 2008). An inclined position could help relieve this discomfort and women suffering from these symptoms may prefer to adopt the sitting position.

As pregnancy progresses into the latter part of the third trimester and the foetus descends in preparation for birth, some of the symptoms of reflux and shortness of breath may be reduced. Aches and pains may alter for the mother with this change in foetal position by changing forces and pressure through the pelvis and therefore it is reasonable to expect that the preferred therapeutic positions will alter accordingly. A change in foetal position may account for the tendency to select the side lying position towards the end of pregnancy and why the sitting position is less comfortable for some women.

Lying in the prone position for therapeutic intervention is not usually possible for women in later stages of pregnancy even though it is known that compression of the maternal large blood vessels by the gravid uterus is eliminated when adopting the prone lying position (Nakai et al 1998). Prone positioning is not used often because beds that allow for this position in pregnancy are not readily available in most physiotherapy settings. The closest position to prone lying that was examined in this current study was the quarter turn from prone, which was found to be the least preferred position at all the stages of pregnancy, often due to awkwardness of the arm position.

As part of the feedback in this study, some of the participants stated that their lumbo-pelvic pain was more noticeable in the quarter turn from prone position. In the quarter turn from prone position the pelvis is subjected to some torsion with one leg flexed and the other leg extended which may create physical challenges for some pregnant women. Although quarter turn from prone was rarely ranked as the favourite treatment position it was often the second choice. The gravitational effect of the uterus on the abdominal blood vessels is reduced in the quarter turn from prone position, as it is with side lying, and a greater level of abdominal support gave some participants a degree of comfort.

The small sample size is a notable limitation of the current study. A larger sample size would have provided more representative data and analysis of those pregnant women who experience PRLPP and their associated positional preferences. The lack of an independent examiner to carry out the testing and interviewing is a further limitation that needs to be acknowledged. Although the telephone interviewing was carried out in order to gather specific information the interview process was not strictly standardised. One of the strengths of the study is the longitudinal nature of the study design which allowed the preferences of the women to be monitored throughout their pregnancies. Consequently, relevant information was obtained for physiotherapists who often treat women well before the end of pregnancy.

Future research should now focus on positional preferences for those women seeking treatment for PRLPP. In such research the classification of participants into subgroups of lumbar pain, PGP or alternatively, a combination of these two conditions, as documented by Gutke et al (2010) will assist the analysis of treatment position preference for various clinical presentations.

CONCLUSION

Pregnant women demonstrate definite positional preferences throughout their pregnancy. Side lying was found to be the preferred therapeutic position applicable to physiotherapy in a small group of women experiencing a normal pregnancy. The position preferences of the women match well with the known physiological changes experienced in different stages of pregnancy thereby highlighting the need for physiotherapists to take the stage of pregnancy and the woman's individual preference into account when considering an intervention.

KEY POINTS

- The following recommendations are made relating to positioning choices for pregnant women when seeking physiotherapy. Positional preferences are distinct and varied throughout pregnancy. Information regarding the pregnant woman's preferred sleeping and sitting positions is a useful guide to positional preference for treatment.
- Most women prefer to lie in the side lying position for treatment in the early stages of pregnancy.
- The sitting position is an alternative option for consideration in the third trimester of pregnancy.
- The supine position should be avoided later in pregnancy due to the compromise of the cardio-vascular and haemodynamic system.
- Adapting the side lying treatment position with pillows and leg position should allow comfort and relaxation for specific techniques or interventions if required.

PERMISSIONS

This study was approved by the Upper South B Regional Ethics Committee (Authorisation reference URB/11/EXP/042) along with feedback from the Ngāi Tahu Research Consultation Committee, University of Otago. Written permission for the purposes of publication was obtained from the individual in the figures. Participants were provided with both verbal and written information on the study as well as providing written consent prior to entering the study.

DISCLOSURES

No conflicts of interest have been identified for this research.

ACKNOWLEGEMENTS

The study participants who offered their commitment to this study at a time when living in post-earthquake Christchurch was a challenge in itself. The Midwives on Barrington, Halswell Village Midwives and the Physiotherapy Department of the Christchurch Women's Hospital who offered their time and expertise to this study are also thanked.

FUNDING SOURCE

Canterbury Physiotherapy Charitable Trust, Physiotherapy New Zealand

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Consumers and health professionals' perceptions of Participatory Action Research in developing a health resource

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ABSTRACT

Multiple Sclerosis (MS) has a relatively high prevalence in New Zealand (NZ), which was the setting for this study. Fatigue is a common and one of the most disabling symptoms of MS. Recent research focus has been on developing other ways to manage fatigue than via medication. Participatory Action Research (PAR) is an innovative method of including consumers in the research process. The aim of this qualitative study was to explore perceptions of consumers and health professionals of PAR methodology in the development of a self-management programme for fatigue in MS and to identify considerations for health professionals when working with consumers in the development of health resources. Nine of the ten participants in the PAR group agreed to be interviewed. Semi-structured, individual interviews were audiorecorded and transcribed, then analysed thematically. The themes of 'Having a voice', 'Accomplishment' and 'The process' were all linked by an umbrella theme of 'Empowerment'. Consumers and health professionals perceived that the PAR experience was positive and valuable because it facilitated the sharing of knowledge between health professionals and people directly affected by MS. We believe PAR is a useful tool to facilitate a patient centred approach in developing relevant health resources.

Mulligan H, Wilkinson A, Lusty A, Delorme A, Bong S (2015) Consumers and health professionals' perceptions of Participatory Action Research in developing a health resource. New Zealand Journal of Physiotherapy 43(3): 93-97. doi 10.15619/NZJP/43.3.04

Key words: Participatory Action Research; multiple sclerosis; consumers; health resources

INTRODUCTION

Multiple Sclerosis (MS) has a high prevalence in New Zealand (NZ), which was the setting for this study (Taylor et al 2010). Recent literature suggests that 75-90% of people with MS experience fatigue (Matuska et al 2007). This fatigue is described as overwhelming and like a heavy body tiredness that occurs without warning, at any time of the day (Schapiro 2005). It interferes with activities of daily life. Recent focus has been on developing other ways to manage fatigue than via medication. These include being physically active (White and Dressendorfer 2004), or via cognitive strategies for energy conservation and self-management (Mathiowetz et al 2001, Matuska et al 2007, Twomey and Robinson 2010, Vanage et al 2003).

The dearth of an organised approach to fatigue management for people with MS in NZ prompted a physiotherapist to create a rudimentary course based on the concepts of self-management, intended to enable individuals to be equipped to successfully manage their symptoms on a daily basis (Barlow et al 2009, Lorig et al 1999, McGowan 2012). Formative evaluation of that course and four successive courses showed that they were well received (Snowdon et al 2013). Attendees suggested that it would benefit other individuals with MS in NZ but that they had ideas for improving its format and content. Building on this feedback led to the decision to further develop the programme in a formal manner, via research.

Participatory Action Research (PAR) was chosen as a methodological framework through which to develop the programme. This was because the ethos of PAR should enable the process and its outcomes to remain in the hands of those to whom it really matters, in this case people living with MS (Ehde et al 2013, Seekins and White 2013).

PAR is a problem-solving process involving a group of people coming together with the intent of addressing a common issue and using a cyclic pattern of planning, action, evaluation and reflection. PAR differs from other research approaches in that it empowers consumers by providing a voice for them as active research participants (Baum et al 2006, Whyte 1991). Participants plan and execute actions according to knowledge and personal experiences, which they analyse and reflect upon towards further planning and action. The continuous cycle of reflection and action, as well as the relationships built between members of the group, are argued to be its strength, providing ownership and empowerment for all members of the group (Ehde et al 2013, Kemmis and McTaggart 2008, McTaggart 1991, White and Verhoef 2005).

The PAR group was formed by the physiotherapist who had offered the fatigue management course, using purposive sampling. Six attendees from the previous courses were invited to become part of the PAR group. This was because they had expressed particular interest in further development of a fatigue management programme so that it could be made available to other people with MS in NZ. Two healthcare professionals were also invited, one (a physiotherapist) for research expertise, and another (an occupational therapist) for clinical expertise in fatigue management. Six meetings were held. Discussions at the meetings were audiorecorded, transcribed and read through for topics after each meeting by two health professionals from the group, who presented the topics at the beginning of the next meeting. Reflection and collaborative discussion by the group on the topics then facilitated setting of an agenda for that meeting. This provided a clear outline of the topics that needed to be discussed during the session, as well as the actions that were required by members of the group before the next meeting. Examples of actions were the writing of personal stories about fatigue, taking of photographs to illustrate the stories, research into fatigue management strategies, design of worksheets, and formatting of chapters for the workbook. Because fatigue was often a factor for participants with MS, especially towards the end of a meeting, email was established by the group as another way for people to communicate their ideas in their own time, and outside of the face-to-face meetings. The outcome of the PAR process was 'Minimise Fatigue, Maximise Life: Creating Balance with MS', a six week fatigue management programme for MS, with an accompanying 84 page take home work book and a facilitators' training manual (Multiple Sclerosis and Parkinson's Society of Canterbury (Inc.) 2013).

This paper reports on a study that aimed to: a) obtain an understanding of the perceptions of consumers and health professionals about the use of PAR methodology in the development of a self-management programme for fatigue in MS; and b) identify considerations for health professionals when working with consumers in the development of health resources. The study used a qualitative approach, with interviews to collect the data (Patton 2002).

METHODS

We contacted all of the members of the PAR group by email, about one month after the end of the PAR project, to provide information on this study and invite them to contribute their perceptions and opinions. Nine of the ten individuals who made up the PAR group agreed and provided signed consent to be a participant. Ethical approval for the study was gained from the relevant University Ethics Committee (12/173).

Data Collection

Semi-structured individual interviews were scheduled at a convenient time and location for each participant. These took place in participants' homes, workplaces, and the local library or Multiple Sclerosis Society rooms depending on the individual's preference. Three members of the research team (AL, SD, SB) conducted the interviews using open-ended questions (see Table 1 for questions). The interviews, which ranged from 30 minutes to an hour in length, were audiorecorded and then transcribed verbatim (AL, SD, SB). Personally identifying information was then removed and transcripts were numbered to maintain participant anonymity.

Analysis

We analysed the data thematically using an inductive approach to facilitate analysis, synthesis and description of the data (Thomas 2006). Data from the first two interviews, one from a health professional and one from a participant with MS, were used to develop an initial coding template. To do this, members of the research team independently read a hard copy of the interviews closely several times to gain familiarity with the text. Specific segments of text that were pertinent to the research aims were highlighted. These were assigned descriptors which described the segments as distinct categories. The research team then came together to discuss the individual coding and interpretation of the data, and to agree on the coding and meaning of the different categories identified. This led to the development of a list of 48 labelled categories. This coding template was then used to analyse the remaining interview transcripts, with the addition of new categories as these were identified. Data saturation was reached after interview five, with no new categories emerging in the last four transcripts. Over a number of occasions, the research team then synthesised the categories into themes. We then sent participants the themes together with each theme's contributing categories and asked for their feedback on whether this reflected their perceptions about their PAR experience. We received communication from seven out of the nine participants, with all of them agreeing to the categories and themes.

Table 1: Semi-structured interview questions

1. Could you explain to us what your understanding of PAR is?
2. How did you all come together as a group?
3. Could you describe a typical meeting for me and describe any specific aspects that occurred or were important to you?
4. Could you tell me about any issues that came up during the meetings and how these were dealt with?
5. Could you tell us about your role in the group?
6. If you were going to do it again, what would you change?
7. What did you learn?
8. How did this approach make you feel?
9. What did you enjoy the most/least?
10. Is there anything else that you want to comment on or tell us about?

RESULTS

The final PAR group included six people with MS (five were female), three healthcare professionals (all female, two physiotherapists and an occupational therapist) and a male physiotherapy student on clinical placement with one of the healthcare professionals. Participants with MS used a variety of mobility aids, from motorised wheelchair to walking stick.

The term 'Empowerment' emerged as an umbrella theme drawing together three themes of 'Having a voice', 'Accomplishment' and 'The process'. The themes and their categories are displayed in Table 2 and described below supported with quotes taken from the data. Participants are identified as a participant with MS (e.g. PwMS 1) or a health professional (e.g. HP 1).

Table 2: Themes and categories

Empowerment		
Having a voice	Accomplishment	The process
Freedom of expression	The thrill, joy, pride and ownership in end product	Logistics and organisation
Social interaction	Personal growth	Suggestions for the future
Perception of equality		

Umbrella Theme: Empowerment

This umbrella theme of empowerment captures how the process of PAR facilitated all participants to contribute their own ideas and opinions within a group but at the same time hear and learn from others. The participants with MS and health professional participants were empowered through knowing that their contributions toward the development of the self-management programme would successfully meet a need within the MS community.

> *It sort of made me feel useful. I can do something. When you've had to give up your job, because you can't do it anymore, it's nice to know that you're not totally useless. You're not a disease; you're still the person you were before. And it was fun. [The PAR process], it's just sort of self-fulfilling positivity. I guess people feel part of something, they've owned something and that makes it a really positive process.* (PwMS 3).

In addition, the health professionals spoke about gaining deep knowledge of what is meaningful to individuals living with MS. This they perceived would be transferrable to their clinical practice.

*Theme: Having a voice***.** This theme showed how individual members of the group identified as a group and interacted together; yet also encompassed how participants felt able to make individual contributions and were valued for their input. There was a sense of validation from within the group; people were comfortable to share their ideas for everyone to discuss. There were no boundaries to what they could share and there was no perception of hierarchy within the group, more that everyone had something valuable to contribute.

> *I think people felt free to say what they thought and it was always received very positively* (PwMS 4).

Participants appreciated the respectful interactions between group members that allowed time and space for voicing of opinions. For example, naming the programme was revisited many times, with more than 15 possible options put forward by group members. A final decision was only reached at the last group meeting.

> *I think a very specific memory has to go to choosing the name. We talked about the name so many different times* (HP 4).

Theme: Accomplishment. This theme encompassed the ownership and overall pride in the perceived quality of the final product, coupled with the personal growth that had occurred in its completion. Participants mentioned the overwhelming satisfaction they felt when they were able to hold the high quality resource book and see its contents right in front of them. There was an excitement about being able to see one's own ideas and discussions turned into reality. Not only were participants proud of the group effort but many commented on how satisfying it felt to know that the resource would help so many other New Zealanders living with MS.

> *I was really pleased to be part of it. Because it [the original course] did so much for me; to be able to improve it and make it better for other people gave me a good feeling. It's great to help other people. To work together as a team to make it all happen. It's very inspiring. Yeah, I really enjoyed it* (PwMS 5).

In addition, by sharing knowledge, experiences and opinions about MS with each other, participants with MS had been able to learn about themselves in the light of living with MS. Participants felt that hearing other people's opinions made them see their own situations differently. The process of sharing information helped the participants with MS to learn more about what they themselves were experiencing.

Health professional participants grew in their understanding and respect for the expertise of individuals living with MS. They perceived that participation in the group (and hearing about the impact of MS and its accompanying fatigue) had been a most useful tool for them to realise they had held incorrect assumptions of what may be helpful for people with MS.

> *We hadn't even scratched the surface about what is it really like to live with MS and what's useful to know . . . And I thought I was the expert* (HP 2).

Theme: The process. This theme encompassed participants' views on the organisation and setting up of the PAR group, the way that meetings were run, and the process of developing the fatigue management programme. Many participants mentioned how the setting of 'ground' rules about listening to and respecting others in the group while also being able to voice their own opinions and suggestions was useful in the first meeting. Participants perceived that PAR consisted of teamwork, making group decisions, continuous reflection and equality.

> *All the participants are coming together, making decisions all as equals, all having an action or a role to do to contribute, and then coming back again for the next stage of it* (PwMS 1).

Group members were open-minded so that everyone was able to express their ideas. Participants identified that discussion often deviated but that any group member was able to bring the discussion back on track.

> *We would get through those things [what had been decided was to be on the agenda] but there was a huge amount of other stuff that crept in. Thoroughly enjoyable, I must say, discussions … It wasn't like a meeting; we started with something and somebody would say "I think this" so it would head off down the tangent … Then somebody would sort of say, "well, so do you think?", and we'd go back to the main question* (PwMS 2).

Participants felt there was a good cross section of skills and experiences within the PAR group. They observed that the group worked as a team to make decisions but used individual strengths of group members where appropriate for actions required. Participants talked about the extent to which they and other members of the group had given of themselves, their time and particular expertise.

> *I think [the group] was a good mixture. I think if you were going to do this sort of thing with various people, it is important to have a group … [where] everybody works together, very open about things* (PwMS 6).

Participants identified that they had joined the group without selfish motives; they had wished to share their knowledge and experience to provide a greater depth to the programme. They reported no task had required allocation and tasks were optional with no expectation for any one individual to take on more than they wished to. Despite participants commenting on this, many noted that they had given far more than what they had initially thought would be required. However, participants also noted how they were able to work at a pace that suited them and use their strengths and skills to be of most value to the group.

Some practical suggestions for improving the process of using PAR were identified in the interviews. One issue was with the size of venues for the meetings. These were reported to be not large enough to easily accommodate individuals with walking frames or wheel chairs, which had led to time consuming efforts to get everyone seated at the beginning of the meetings. This was, however, not perceived as having an impact on the group dynamics per se. Additionally, due to the length of time between meetings, participants reported experiencing a loss of momentum. They suggested that meetings should be held more frequently than monthly. Some participants suggested it would have been helpful to have specific time at the beginning of the first meeting to get to know one another before embarking on the important business of the research.

Despite these issues, participants reported gaining enjoyment from the process of the meetings. Participants with MS felt the meetings were personally validating, as well as being intellectually stimulating. Because of the group process, energy and enjoyment were evident within the group, and because of that, work was able to be completed. Participants felt that through the group, they were able to accomplish a lot and build more momentum than they would have done on their own.

> *I would have never have achieved this on my own* (HP 1).
>
> *With a group, you can just create the energy and the momentum to do a lot more than what you perhaps thought was possible* (PwMS 3).

DISCUSSION

The purpose of this study was to obtain an understanding of the perceptions of consumers and health professionals about the use of PAR methodology in the development of a self-management programme for fatigue in MS. Additionally we aimed to identify factors for health professionals to consider when working with consumers in the development of health resources.

The core idea of PAR is to combine the skills and strengths of all participants in an equitable manner (Ehde et al 2013, McTaggart 1991). Our study strengthens this idea, through our participants reporting that the experience was positive, valuable and validating. All members of the group gained knowledge about MS and fatigue in particular while working with others toward a common goal by using their individual strengths and skills. Our findings identified that the use of PAR facilitated equality between those with MS and the health professionals involved, allowing all to contribute to the development of the self-management programme for fatigue in MS. Thus, such an approach provides validity for the end product, because its development included persons living with MS and not only health professionals.

Our study further informs the use of PAR as a methodological approach for development of health resources. The PAR approach (Kemmis and McTaggart 2008) has not yet been used extensively in the area of health compared to its more common application in the social and political setting (Tsey et al 2002). We suggest that the PAR approach could potentially be used to advantage in developing health resources or interventions for people with debilitating long-term conditions other than MS, examples being Parkinson's disease, stroke and traumatic brain injuries. Indeed it is apparent from our findings that it is the individuals with a specific condition who hold the expertise about their condition (Thorne et al 2000, Townsend et al 2006). Making use of the PAR approach could assist health professionals to access this expertise and form an empowering partnership (Seekins and White 2013).

Issues for health professionals to consider when using PAR with people with long-term conditions are the following: to have an initial group bonding meeting for group members to introduce themselves and get to know others in the group. This would assist in establishing connections and group cohesiveness. Plan for space and access for participants who use mobility equipment. In addition loss of momentum would be avoided and the process allowed to move faster if meetings were scheduled more often than monthly, or if a summary of meeting transcripts were sent in advance of the next meeting, for example via email. This would allow prior preparation and thought before the next meeting.

A limitation of this study is that the interviews were undertaken at one point in time, about a month after the end of the project. Different data may have been received if interviews had been conducted at different time points during the project. Indeed it may have been most insightful to have conducted a series of interviews during the process of the project, as this may have identified issues early on which could have then been addressed during the project.

CONCLUSIONS

In conclusion, this study has demonstrated PAR to be a positive and rewarding experience for consumers and health professionals. The nature of PAR is to bring people together to work effectively as a team towards a common goal. The depth that can be obtained through this type of research is far more than one can achieve individually. We have shown the usefulness of the approach in developing meaningful resources for use in the health sector.

PAR gives a voice to those who live with long-term conditions, thereby enabling personal growth, as well as the opportunity to help others. This is empowering. There is a growing need for more patient centred approaches in health care and we believe PAR may be an appropriate option in this regard, allowing health professionals to truly develop partnerships with health consumers, in order to develop meaningful and valid health resources. Furthermore, it is our role as health professionals to develop services that are meaningful and effective for our patients or clients. We anticipate that the programme developed through this study is a step towards fulfilling this need.

KEY POINTS

- Participatory Action Research (PAR) is an innovative approach to empowering and including consumers in the development of a health resource.
- PAR can facilitate the sharing of knowledge between health professionals and the consumers for whom a particular health resource really matters.
- While PAR is a useful tool to facilitate a patient centred approach, it may require a flexible approach to the cycles of PAR to enable consumers to be involved.

PERMISSIONS AND DISCLOSURES

The authors received no financial support for the research, authorship and/or publication of this manuscript. The first author was a member of the PAR team.

ACKNOWLEDGEMENTS

We wish to acknowledge our participants for their contributions and willingness to assist in this evaluation of the use of PAR in the health care sector.

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Implementation of physical activity for individuals with severe neurological disability

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ABSTRACT

People with severe neurological disability demonstrate very low levels of physical activity. This may be partly due to physical and/or cognitive impairment, although other factors may contribute. We aimed to investigate and evaluate the processes required for individuals with severe neurological disability to participate in physical activity. This study used a case study design with five participants (three men, two women) who lived in one residential care facility. Each participant and a physiotherapist worked collaboratively to choose, plan and participate in recreational activity over a 12-week timeframe. Data were collected through the physiotherapist's field notes and semi-structured participant interviews. Four participants successfully engaged in their chosen physical activity. The data were analysed inductively for themes and three themes with sub themes were identified. The three themes: 1) There's more than one road to Rome, 2) Benefits, and 3) The ripple effect, highlighted both successful strategies and barriers encountered by participants during this process. This study concluded that it is possible for people with severe neurological disability to be physically active; however, success requires a creative approach to targeting desired and meaningful activities, problem solving through the presenting barriers, and utilisation of available resources.

Buick AR, Mulligan HF, Smith CM (2015) Implementation of physical activity for individuals with severe neurological disability. New Zealand Journal of Physiotherapy 43(3): 98-104. doi 10.15619/NZJP/43.3.09

Key words: Physical Activity, Neurological Disorder, Residential Facilities, Severe Disability

INTRODUCTION

The long-term health benefits of regular participation in physical activity (PA) include reducing risk factors, incidence and impact of non-communicable diseases (World Health Organization 2009). Physical activity is defined as "any bodily movement produced by skeletal muscle that results in energy expenditure" (Casperson et al 1985, p 126). Physical activity levels are decreasing globally (World Health Organization 2010a), and consequently, international, national, and local health policies are now focused on increasing participation in PA for all populations (New Zealand Ministry of Health 2000, World Health Organization 2010b). Despite this focus, the facilitation and implementation of PA for individuals with disability is unclear, especially for individuals who are non-ambulatory and have multiple impairments, for example those with chronic, severe neurological conditions. The World Health Organization (2011a) reports that there are more than one billion people living with disability and 25 million people with neurological disorders worldwide. According to the latest census data, 24% of New Zealanders identified themselves as having a disability (defined as "limited in their ability to carry out every day activities by at least one impairment type) (Statistics New Zealand 2013) and in 2006, 383,500 adults in New Zealand were reported to have a physical disability (Statistics New Zealand 2006).

Individuals with severe neurological disabilities and who require a power wheelchair or an attendant to propel a manual wheelchair for all mobility are susceptible to complications such as scoliosis, osteoporosis, overuse syndromes, pain, skin breakdown, respiratory infections, arthritis, urinary tract infections, and obesity (Coyle et al 2000, Kinne et al 2004). These complications can initiate a descending cascade of events such as reliance on others for daily cares and reduced self-efficacy (Durstine et al 2000, Gajdosik and Cicirello 2001, Klingbeil et al 2004). Therefore, both the primary condition and concomitant complications have the potential to limit an individual's ability to be physically active.

The recommended amount of PA for an adult is 30 minutes of moderate-intensity activity five days per week and muscular strengthening exercises for the main muscle groups at least two days per week (Garber et al 2011). Individuals with disabilities (Cervantes and Porretta 2010, McGuire et al 2003, Motl et al 2005), including those with severe neurological disability (Motl et al 2005) are less likely to participate in the recommended amounts of PA compared to the general population. This may in part be due to there being fewer opportunities for incidental PA compared to those available for the general population. As an example, if the individual is reliant on a power wheelchair for mobility, choosing to take the stairs is not possible. Furthermore, personal, environmental and societal barriers may account for lower levels of PA participation (Beckerman et al 2010, Damush et al 2007, Rimmer et al 2008). Examples of these are cost (e.g. of suitable transport), an inaccessible environment, regulatory processes, lack of information about opportunities available, attitudes from others, emotional barriers, and lack of suitable resources. Even though individuals with severe neurological disability may not be able to achieve the recommended levels of PA, participation in some PA still provides benefit (Garber et al 2011). Health professionals can play a role in promoting PA for all individuals, including those with severe, neurological disabilities; however, this role is often not prioritised (Mulligan et al 2011, US Department of Health and Human Services 2009). Facilitation of PA by health professionals (including assistance to overcome the identified barriers) can be limited by funding, prioritisation and resource availability (Mulligan et al 2011, Mulligan 2011), thereby making it challenging to find ways for this population to be physically active.

The aim of this study was to investigate implementation of PA for individuals with severe neurological disability who lived in a residential service. Specific objectives were to: i) identify strategies that enabled PA participation, ii) gain insight into the processes required to minimise barriers and use facilitators, and iii) explore the experiences of individuals with severe neurological disability in participating in PA.

METHODS

This study used a qualitative, bounded, case study methodology as described by Baxter and Jack (2008). The boundaries were defined by i) the study being sited in one residential service situated in a large metropolitan area of New Zealand, ii) at one point in time, and iii) with three researchers (all physiotherapists, one of whom provided the intervention for this study) and individuals with severe neurological disability that necessitated living in residential care. The New Zealand Health and Disability Ethics Committee provided ethical approval (reference number NTY/11/03/032).

Five participants were recruited via consultation with residential service staff members who identified eligible individuals (see Table 1). Nine of the 65 residents met the inclusion criteria and were invited to participate in the study. Inclusion criteria required that they were reliant on a power wheelchair or an attendant to propel their manual wheelchair for mobility, they were able to perform voluntary movement and communicate sufficiently to take part in an interview. One of the members of the research team met each of the nine potential participants individually to explain the study more fully, and of these, five provided informed consent for the study. If a participant had a welfare guardian, the welfare guardian was contacted and provided written informed consent on the participant's behalf following discussion with the participant. Participation was voluntary and did not involve withdrawal from any activities or therapy intervention they were already receiving.

Table 1: Study Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
A full time resident at the residential service	Inability to perform any voluntary movement of the limbs or trunk
Reliant on a power wheelchair or attendant to propel their wheelchair for the majority of their mobility	Being medically unwell or unstable
Able to communicate either verbally or via technology in order to participate in interviews	

The method is outlined in figure 1. The lead researcher (AB) met with each participant individually to discuss and explore what general and PA interests the participant held. These ideas were then discussed with the research team for suggestions as to how they could be incorporated into PA opportunities for the participant's environment, this being either the immediate environment, that is within the residence, or the broader community environment. We encouraged each participant to make or arrange as many of the required decisions and organisational tasks as he/she was able including encouraging participants to review websites of organisations advertising their PA of interest, and assist in making contact with them.

Each participant engaged in their chosen PA for a period of six weeks, with support from the lead researcher for the first one or two weeks where required. The intent of this timeframe was to provide opportunity to identify and resolve barriers. After the six-week period, the participant chose whether to continue the PA, to stop, or to choose and take on a different PA. At this point, continuing PA was facilitated with support established during the study period, including volunteers and staff from the facility, but was without further input from the research team.

We collected demographic data (including primary diagnosis, comorbidities, and level of function via the Functional Independence Measure and Functional Assessment Measure (FIM+FAM)) from the participants' medical records. The FIM+FAM provided a measure of the functional impact on daily life of the impairments experienced by the participants. We recorded detailed descriptions of the process for each participant via field notes documented by the lead researcher. These were from observations, reflections, discussions and suggestions by the research team and participant as well as feedback from the participants' friends, family and the service's staff. We also undertook individual semi-structured interviews with participants, conducted by the lead researcher at six weeks and again at 12 weeks. These interviews used questions such as "can you tell me the story of you starting your activity?" and "can you tell me about a highlight or difficulty you experienced?" The interviews were audio-recorded and then transcribed verbatim.

We analysed the data for themes as described by Braun and Clarke (2006). The lead researcher read all of the data multiple times then identified and coded similar concepts from the data together to form an initial coding template. This was then reviewed individually by each of the other two researchers and then together as a team to discuss and agree on the final coding template. We then grouped codes together into common themes, with their accompanying sub-themes. We reviewed and revised these themes until we were satisfied that they were an accurate portrayal of our data. The lead researcher presented the themes and subthemes to our participants (who agreed that it reflected their experiences).

RESULTS

The demographics and case report summaries of the five participants are detailed in Table 2 and in the commentaries below. Scores on the FIM+FAM showed a mean of 113.6 (range 96/210 to 141/210), indicating high levels of dependence on others for daily living requirements.

Table 2: Participant Demographics

Participant	Health Condition and Impairments	Secondary impairments, co-morbidities and secondary conditions	Age	Main mode of Mobility	Years since onset	FIM+FAM score
SK (Female)	Stroke resulting in right hemiplegia, dysphagia, poor saliva control, reduced speech intelligibility, and reduced insight, safety awareness and impulsivity.	Multiple previous strokes, asthma, obesity, type II diabetes, osteoarthritis of both knees and chronic obstructive pulmonary disease.	54	Attendant propelled manual wheelchair	2	114/210
CD (Male)	Quadriplegic cerebral palsy resulting in global spasticity and mild cognitive impairment.	Soft tissue contractures, skeletal malformation, bowel cancer resulting in colostomy, obesity	69	Power wheelchair	69	107/210
HR (Male)	Stroke resulting in right hemiplegia, spasticity of right arm and leg and nominal aphasia.	Soft tissue contractures, renal dysfunction, and overweight.	64	Power wheelchair	9	110/210
ZD (Male)	Quadriplegic cerebral palsy resulting in global spasticity.	Soft tissue contractures, skeletal malformation, mild intellectual impairment, restrictive airways disease and renal dysfunction	72	Power wheelchair	72	141/210
PD (Female)	Multiple sclerosis resulting in lower limb paralysis, upper limb muscle weakness, limited trunk control, bladder and bowel dysfunction	Soft tissue contractures, stuttering speech disorder	56	Power wheelchair	18	196/210

All five participants completed the study, with four of the five participants taking part in their chosen PA for the full six weeks. The fifth participant was able to choose and find a preferred PA, and trialled it on one occasion. However, he was unable to find the appropriate support required for him to enable regular attendance at the activity in the six-week timeframe. Three participants continued their PA to the 12-week timeframe and one participant chose to pursue a different form of PA after the first six weeks.

Case report summaries

Participant SK

SK had been living in residential care for the past two years and dreamed of one day returning to living independently in her own home. SK's choice of PA was dance. After we discovered a mixed abilities dance group active in the area, SK attended a public performance of the dance group with the lead researcher (AB), which SK thoroughly enjoyed. AB assisted SK to contact the teacher (via email) and arrange to attend classes. It took a full school term to find a suitable volunteer to assist SK to attend the dance classes. SK's participation in dance has continued into a third term and she has since participated in the dance group's annual public performance.

Participant CD

CD has lived in residential care since he was a child. He has been reliant on a wheelchair for mobility since age eight and now uses a power wheelchair. CD uses a hoist for transfers and requires full assistance for his daily care activities.

CD quickly identified that he wished to have an activity based around animals, specifically dogs. On further discussion, he suggested that he could invite one of his long-time friends to bring in her dogs so that he could exercise them by throwing a ball. We found, that because of CD's muscle weakness, soft tissue contractures and skeletal malformation in his fingers, wrists, elbows and shoulders, as well as dystonic movement patterns, throwing a ball was challenging, although with practice and hand over hand assistance at first, he improved his throw from a distance of one metre to eight metres over six weeks.

Participant HR

HR resides at one of the service's community homes. He requires one person to assist with a standing transfer and he uses a power wheelchair for all of his mobility. Although HR has a strong connection with his family, they are all living overseas so HR currently has little local social support.

Coincidentally, in the week prior to meeting with him to discuss his interests for PA, AB had organised a volunteer to meet with HR on a weekly basis at his community home, as a social contact because of the lack of family contact. When HR was asked about his interests for PA, he said he had already started playing pétanque (a game similar to bowls) with the volunteer. HR had been given the pétanque set as a present by his sister, but had not played it until the volunteer started visiting. Therefore, once the opportunity was available, HR had spontaneously initiated PA. In his interviews, he spoke repeatedly about the social aspects that pétanque had afforded him and how important having the social interaction around the PA was to him.

Participant ZD

ZD has lived in residential care since he was a child. He requires full assistance for the majority of his self-care activities but is able to complete his grooming independently once set up with the equipment he requires. ZD uses a hoist for all transfers and a power wheelchair for all mobility. Once in his power wheelchair he is independent. ZD's closest family support (his siblings and their families) live an hour's drive away.

On first meeting ZD to discuss PA he suggested bowls. The research team suggested that a game called boccia could be suitable. This is an adapted form of indoor bowls, played by people with physical disabilities, where different density leather balls are thrown overarm, underarm or pushed down a gutter depending on the person's ability. ZD was very keen to explore this option. A sports and recreation organisation for people with disabilities was able to provide us with information on local sessions and ZD was invited to attend a session. ZD was supported to attend the session by AB, using the service's wheelchair accessible van. ZD enjoyed the game and was keen to attend regularly. Unfortunately, however, we were unsuccessful in finding an appropriate volunteer who would be willing to drive the van and attend the sessions with ZD by the 12 week timeframe. Furthermore, the venue was located 35 kilometres across town, thereby making a taxi fare unaffordable for ZD. This, and the need for a support person to be with him at the boccia, were barriers too great to overcome and ZD did not participate further in boccia.

Participant PD

PD also resides in one of the service's community homes. PD transfers using a sliding board technique with the assistance of two people and uses a power wheelchair for all her mobility. PD often drives in her power wheelchair to the local shops but to go further afield requires a wheelchair accessible vehicle. She has two daughters who live in the same city and visit her often.

PD quickly identified netball as her PA of choice, having enjoyed playing netball when she was younger. AB suggested joining a school team to assist with their drills and practices. PD however suggested that it would be less challenging for transport and its associated costs if other netball players were to come to her residence, given there was a netball hoop on the lawn. PD also suggested that there was another resident in the home who could join in and possibly benefit from playing netball.

We therefore sought to find a volunteer/s willing to come to the home to play with PD and the other resident. After contacting a school with a strong focus on community service, two 17-year old girls volunteered to come each week to complete netball drills and shooting with PD and the other resident. As all volunteers recruited to work in the service have to undergo an interview to deem their suitability for the position and complete a police security check, PD assisted AB with the interview and paperwork and also explained to the volunteers the nature of the support she would require for netball.

Themes

We identified three themes from the data which helped to explain the experiences of all participants; 1) There is more than one road to Rome, 2) Benefits, and 3) The ripple effect.

Theme one – "There's more than one road to Rome".

This theme exhibited that there are many ways to overcoming barriers to PA. Achieving PA by the participants required creativity around identifying and problem solving the barriers that presented and sufficient time to address the barriers. It also required identification of resources and resources already in hand, keeping the activity as simple as possible and being flexible in reaching the goal.

The most frequent barriers we identified were the cost and availability of suitable transport, together with a lack of suitable support persons, such as volunteers, to accompany the participant. We found we had to allow extra time and planning because of this.

> *No further replies were received from the advertisement for a volunteer... It took longer than a full school term to find an appropriate volunteer."* (Researcher's field notes)

We did however discover that using already available professional and social networks assisted us in finding suitable volunteers. One example of this was the recruitment of volunteers through a school network, using the Duke of Edinburgh's award programme (an award programme for youth which requires them to work in four areas including community service.)

We also identified preconceptions and assumptions that presented as potential, rather than real barriers. For example, we had assumed that the cost of attendance at a dance class for SK would be prohibitive because SK was on a disability benefit. This preconception was however challenged firstly by the dance group's director and by SK:

> *The director of the company explained the cost and stated 'however I wouldn't want this to be a barrier so if [SK] is unable to pay, this can be negotiated'.* (Researcher's field notes)
>
> *I can pay. I get my benefit every week. It's worth it.* (SK 6 week interview)

In addition, the simplest ideas were the ones that were easiest to achieve and maintain. One participant highlighted this in the interview;

> *What would you suggest to people with disabilities who want to start some physical activity?* (Interviewer)
>
> *Do something easy at home.* (HR 6 week interview)

Flexibility was also required to modify activities to the needs of the individual or to a specific context. This involved challenging our preconceptions and managing the unpredicted events as they arose. For example, the dogs who had 'volunteered' for the ball catching activity would not fetch the ball. Nevertheless, the participant could still throw balls for the dogs.

> *I think the best bit was throwing the balls at the dogs but the dogs didn't go and chase the ball, they kept running away from the ball.* (CD 6 week interview).

Theme two - Benefits

This theme encompassed the physical, social, and emotional benefits that the participants perceived through their experience of being physically active.

SK's dancing prompted her to identify functional goals that now seemed more achievable to her.

> *"Yes I don't want to sit in the wheelchair anymore. [If you exercise] you get skinny [and] I want to learn how to go to the toilet and get off the toilet."* (SK 6 week interview)

For HR, the social benefits, for CD the intellectual stimulation and both CD and SK the emotional benefits were the standout experience.

> *"What has the best bit been?"*
>
> *"The company."* (HR 12 week interview)
>
> *"What have the benefits been?"*
>
> *"Well it can improve everybody, it can improve everyone as well as myself… gets the old brain something different to think about...it makes you happier."* (CD 12 week interview)
>
> *"How does dancing make you feel?"*
>
> *"Good inside [taps chest]… . It helped me a lot. I want to live again by myself. I love it, love it, love it."* (SK 12 week interview)

Theme three - The ripple effect

This third theme is labelled the ripple effect because it describes the flow on effect of participation and enthusiasm for PA beyond that of the five participants included in this study. Because of the discussions that this entailed with staff and other residents at the facility and its two community houses, attention, participation and enthusiasm towards PA were evident among the staff, management and other residents, resulting in further residents and staff being involved in PA.

> *Does anyone else join in?*
>
> *Yeah my neighbour [another resident]. I might see if some of the staff will play it.* (PD 6 week interview)
>
> *After the first two case studies I noticed staff showing an increase in awareness of PA for residents, and even the managers talking about ways to facilitate PA for other residents using my case studies as examples.* (Researcher's field notes)

DISCUSSION

This study demonstrated that despite many barriers, it is possible for individuals with severe neurological disability, who live in residential care, to participate in PA. Success was however dependent upon a number of factors including: choosing PA that is of personal interest to the individual, addressing the barriers, allowing more time and planning than expected, using existing networks and resources, keeping the chosen PA task simple and being creative and flexible. The study also revealed that individuals with severe neurological disability have similar goals, motivations for, and perceive the same benefits of being physically active as anyone in the general population. Furthermore, the facilitation of PA for targeted individuals can have a flow on effect within a residential service such as the one in this study.

Of 64 residents living in the service, only nine met the criteria for inclusion in the study, in that they were reliant on a power wheelchair or an attendant to propel their manual wheelchair for mobility, they were able to perform voluntary movement and communicate sufficiently to take part in an interview. People with complex conditions are frequently excluded from studies investigating participation in PA (Beckerman et al 2010, Haworth and Young 2009). However, we found it reassuring to discover that, with perseverance and a unique and individualised approach, it is nevertheless possible for individuals with severe and complex conditions to participate in and enjoy PA.

In line with the literature on barriers to PA for individuals with neurological disability (Mulligan et al 2012, Rimmer et al 2004, Rimmer 2008, World Health Organization 2011b), we also identified a number of barriers. In our study, lack of access to suitable transport, cost (of transport) and the availability of suitable support personnel were the most challenging to overcome. Four of the five participants required a wheelchair accessible vehicle with a wheelchair hoist and driver to access venues away from their residence. The fifth participant was able to transfer into the front seat of the car but only if her support person was trained in how to assist her to do this and furthermore, knew how to pack away the wheelchair and load it into the car. Like Kirchner et al (2008), we also found that strategies to overcome such barriers need to be individualised and this took more time and effort than we had anticipated.

Literature frequently cites the cost of attendance at recreational programmes as a barrier (Rimmer et al 2004, Rimmer 2008, Warms et al 2007). A review study by Mulligan et al (2012) identified that the cost of accessing suitable venues and recreational programmes was an important barrier from the perspective of people with disabilities. Our study, however, found that it was not so much the cost of attendance at the PA that was the main barrier, but the cost of specialised accessible transport. In addition, we found that cost in itself might be a perceived and not a real barrier. It is therefore possible that health professionals may perceive inaccurate barriers, and that this preconception might in itself become a barrier, thereby resulting in reduced promotion of PA.

In this study personal connections to volunteers from groups that demonstrate a dedication to community service, such as schools or other groups, proved to accelerate the recruitment of volunteers. Using one's own connections therefore seems to be a useful strategy in finding appropriate support. Establishing a "friends of" or a social network group may help to provide a further network to draw upon. Indeed, Gingras (2003) used this type of approach to promote community relationships and build collaborative programming between organisations to maximise and share resources.

Literature and policy (Gingras 2003, New Zealand Ministry of Health 2001, World Health Organization 2011b, Vislie 2003) encourage full integration of individuals with disabilities into society so that they can contribute equally to society (Van de Ven 2005). Although our participants had the choice to leave their place of residence for their PA, interestingly, three chose their own living environment for its familiarity and lack of barriers, specifically transport and cost. This preference fits with a study by Milner and Kelly (2009), also conducted in New Zealand, where individuals with disabilities identified that they enjoyed the security, comfort, simplicity, and predictability of an environment known to them, where support persons understood their needs.

Our participants recognised the same motivators for PA as a non-disabled population. To this end, they perceived the benefits and motivators of losing weight, achieving physical goals, social interaction and enjoyment. It appears that the reality of the benefits of PA are no different for people with severe neurological disabilities than for the general population. This fits with the American College of Sports Medicine guidelines (Garber et al 2011) that recommend that if people are unable to achieve the recommended levels of PA, they can still gain benefit from lower levels.

The ripple effect from role modelling of our participants becoming physically active led to other residents partaking in PA beyond that of the research study. A study by Heller et al (2002) found that participation in PA for adults with cerebral palsy living in nursing homes was heavily influenced by the caregivers' attitudes towards PA, so that where caregivers had a negative attitude towards PA, then those residents did not participate in PA. This suggests that if staff in residential services are able to observe the benefits of PA for individuals within their care and can learn through modelling experiences how PA can be modified to be achievable, then participation levels of the residents may rise. This concept, however, requires further investigation.

CONCLUSION

This study found that it is possible for people with severe neurological disability to achieve PA but that success requires creativity in targeting desired and meaningful activities, time, problem solving, and the identification of resources. Initiation of PA can initiate the 'ripple effect,' a widening awareness and subsequent participation in PA beyond the original clients. Because PA is important for everyone, including people with severe disability, we therefore suggest that health care providers have a responsibility to be creative and seek ways of implementing and enabling PA for their clients. This study informs individuals with disabilities and their support persons, health care professionals, people who provide PA opportunities, and funders of services for individuals with disabling conditions about ways to achieve health and well-being via physical activity.

KEY POINTS

- It is possible for people with severe neurological disability to become physically active.
- Participation in physical activity by people with severe disability requires creative support from support persons and health care providers, but can nevertheless be achieved for people living in a residential facility.
- Modelling of physical activity participation by some individuals creates a widening awareness and subsequent participation by others.
- Individuals with severe neurological disability, although commonly unable to achieve the recommended level of physical activity for health, are able to gain benefits from participation in physical activity.

PERMISSIONS

The New Zealand Health and Disability Ethics Committee provided ethical approval (reference number NTY/11/03/032) for this study. Participants provided informed consent for the study. If a participant had a welfare guardian, the welfare guardian was contacted and provided written informed consent on the participant's behalf following discussion with the participant.

DISCLOSURES

The lead author is employed by the organisation that funds and manages the residential facility in which participants lived, and received partial financial support from the parent organisation towards completion of her Master of Physiotherapy, which this study was part of. The other two authors report no declarations of interest.

ACKNOWLEDGEMENTS

The authors would like to acknowledge the participants and residential service in which this study took place for their support for the study. The study was completed in partial fulfillment of the first author's Master's degree, which was funded in part by a Fellowship Trust grant from the parent company of the residential service.

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Bridging the intention-behaviour gap with behaviour change strategies for physiotherapy rehabilitation non-adherence

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ABSTRACT

This paper reviews the problem of poor adherence to physiotherapy, the associated barriers and facilitators to adherence and bridging the intention-behaviour gap using behaviour change strategies. Adherence to physiotherapy, especially home-based physiotherapy that includes exercise programmes is problematic, which may be due to patients having to implement new behaviours and then integrate them into their daily lives. Further, patients may be adherent to some components of their physiotherapy and not others. Despite clinical, treatment and psychological factors being identified as reasons for poor adherence, the problem still persists. Effective patient education methods are not the total solution to the problem; patients need to be given skills to integrate the physiotherapy activities into their daily lives. Behaviour change strategies provide these skills and enable patients to bridge the intention-behaviour gap. These strategies strengthen patients' self-efficacy and should be selected to meet their needs and assist them to overcome their perceived barriers to undertaking the rehabilitation activities. While treatment goals provide patients with incentives to achieve their desired outcome they do not successfully bridge the gap. Valuable behaviour change strategies are verbal feedback, reinforcement, exercise testing, decision balance sheets, self-regulation, relapse prevention, progressed graded activities and booster sessions and action and coping plans.

Bassett SF (2015) Bridging the intention-behaviour gap with behaviour change strategies for physiotherapy rehabilitation non-adherence. New Zealand Journal of Physiotherapy 43(3): 105-111. doi 10.15619/NZJP/43.3.05

Key words: physiotherapy rehabilitation adherence, adherence barriers and facilitators, intention-behaviour gap, behaviour change strategies

INTRODUCTION

Patient education is valued by physiotherapists, with upwards of 90% using it in their daily practice (Chase et al 1993). Those who took part in the Chase et al (1993) study reported educating their patients about the rationale underpinning their treatments and home programmes with the emphasis on their exercises. The most popular educational methods were discussion, demonstration of exercises, and patient instruction sheets that included diagrams. More recently, electronic methods of patient education have been developed in other areas of health care (Fox 2009, Wantland 2004). However despite the best efforts of physiotherapists in educating patients about their treatment and their role in it, less than desirable adherence to physiotherapy still persists. Patients frequently report forgetting to do their home-based physiotherapy activities, which could well be due to an inability to integrate these into their daily routines (Sluijs and Knibbe 1991). Assisting patients to adhere to their physiotherapy programmes is considered to be a two-step process involving effective education and strategies to integrate the activities into their daily lives and routines (Sluijs and Knibbe 1991). The latter can be achieved by the use of behaviour change strategies, also known as behavioural interventions or cognitive-behavioural techniques, which have been shown to help patients adhere to their physiotherapy rehabilitation (Bassett and Prapavessis 2007). It is these methods that are frequently omitted from physiotherapy rehabilitation, yet should be an integral part of it. Therefore this review will focus on the extent of the problem of poor adherence to physiotherapy, the barriers to and facilitators of adherence, and bridging the intention-behaviour gap using behaviour change strategies that can be applied to physiotherapy rehabilitation. For the purposes of this paper the term behaviour change strategies will be used in preference to behavioural interventions and cognitive-behavioural techniques.

The Problem of Poor Adherence to Physiotherapy Rehabilitation

Adherence to physiotherapy rehabilitation requires patients to implement a number of different activities, such as attending clinic appointments and following the clinic-based and home-based treatment programmes (Bassett 2003, Brewer 1999). Given the number of activities patients have to undertake during a course of physiotherapy rehabilitation, it is not surprising that their adherence to the clinic-based treatment is less than optimal, with non-adherence rates being between 6% and 40% (Byerly et al 1994, Duda et al 1989, Lampton et al 1993).

Adherence to components of the home-based rehabilitation is also less than desirable. In a landmark study, Sluijs et al (1993) found that 24% of patients were non-adherent, 41% were partially adherent and 35% were highly adherent. Similarly, Taylor and May (1996) found that 60% of patients did not follow the advice about refraining from activities that are detrimental to optimal recovery. Patients may not necessarily adhere to all components of a physiotherapy rehabilitation programme. Alexandre et al (2002) found in a back pain study, the percentage of patients who either did not adhere at all or were poorly adherent differed from 49% with clinic attendance, 41% for watching back education videos and 65% for undertaking a prescribed exercise programme. It is apparent from the findings of these studies that adherence to home based activities is problematic with a higher percentage of patients not adhering fully to their required programmes.

Poor treatment adherence has been also classified as intentional and unintentional non-adherence (Horne 1998). When applied to physiotherapy rehabilitation intentional non-adherence can occur when people actively decide not to follow the prescribed treatment for some reason, such as not being able to integrate it into their daily lives. Unintentional non-adherence is a common problem in physiotherapy rehabilitation and frequently happens when the treatment programme is too complex or for whatever reason patients have difficulty integrating the programmes into their daily lives (Sluijs and Knibbe 1991). Finally there are differences in the adherence to short- and long-term programmes, with the latter being the most challenging, especially if they include exercises (Dishman 1991, Ice 1985, Schachter et al 2003). Short-term adherence is usually considered to occur when the activities need to be undertaken during the formal physiotherapy rehabilitation, whereas long-term adherence is required after the formal programme is completed (Sluijs and Knibbe 1991). The problem of adherence to long-term exercise programmes is becoming more important in physiotherapy with the recognition of the positive effects of regular exercise with the increasing ageing population and the prevention of lifestyle disorders (Dean 2009).

Barriers and Facilitators of Adherence

Factors that influence the extent to which patients adhere to their physiotherapy rehabilitation are classified as either barriers, which hinder patients following their treatment, or facilitators that foster their adherence. To some extent barriers and facilitators have an inverse relationship such that a poor sense of coping is a barrier whereas a strong sense of coping is a facilitator. The barriers to adhering to clinic- and home-based physiotherapy rehabilitation have been reported extensively. A number of socio-demographic barriers have been identified, but these are rather contradictory and may be sample dependent. For example, Brewer et al (2000) reported that the younger participants were less adherent than the older ones, whereas older women with fibromyalgia (Dobkin et al 2006, Oliver and Cronan 2002) and with osteoarthritis (Castaneda et al 1998) have been found to be less adherent than their younger counterparts.

A number of clinical and treatment factors have been identified as influencing adherence, but once again some of the research findings are contradictory. Some of these factors are well known barriers to adherence. Examples of clinically related factors are disorders that have periods of remission during which the symptoms are minimal (Sluijs and Knibbe 1991); conditions requiring long-term home based management (Alexandre et al 2002); and complex intrusive treatments/exercise programmes (Flynn et al 1995), especially those that require the assistance of other people (Muszynski-Kwan et al 1988). Patients' beliefs about their injuries/disorders have been found to influence their level of rehabilitation adherence (Taylor and May 1996). In particular, patients who were poor adherers did not believe that their injury was serious and that they were susceptible to further injury if they did not follow their rehabilitation programme. Furthermore, overloading patients with too much information about their injury/disorder and treatment during clinic treatment sessions confuses patients, thereby acting as a barrier (Sluijs et al 1993). However the influence of pain on rehabilitation adherence is not so clear. High levels of pain have been found to reduce adherence to exercise programmes for people with fibromyalgia (Dobkin et al 2006) and osteoarthritis (Rejeski et al 1997). In contrast, Sluijs et al (1993) found that pain did not affect adherence to home-based exercise programmes.

Psychological factors have been found to influence the extent to which patients adhere to their rehabilitation. Patients' perceptions about the barriers to undertaking their rehabilitation programme may operate more strongly than actual barriers (Alexandre et al 2002, Dobkin et al 2006, Sluijs et al 1993). These barriers are commonly not enough time, forgetfulness and inability to fit the rehabilitation into their daily activities (Pizzari et al 2002, Sluijs et al 1993). Other psychological factors that affect adherence are low levels of a sense of personal control (Laubach et al 1996) and self-motivation (Brewer et al 2003, Brewer et al 2000); the presence of depression at the beginning of the rehabilitation (Oliver and Cronan 2002, Rejeski et al 1997) and high anxiety and stress (Dobkin et al 2006); and a sense of helplessness (Castaneda et al 1998, Sluijs et al 1993).

The one psychological factor that has been found to have a very strong impact on rehabilitation adherence is self-efficacy. It is defined as "perceived self-efficacy refers to beliefs in one's capabilities to organize and execute courses of action required to produce given attainments" (Bandura 1997a, p3). Bandura (1997a) also conceptualised perceived self-efficacy as being situational specific, with people feeling efficacious about doing some activities, but not others, as well as being able to do some tasks in some situations but not others. For example, physiotherapists may feel efficacious about presenting a seminar to small groups of their peers, but the same therapists may not feel at all efficacious about presenting the same seminar to a large group of peers in a conference auditorium. Nonetheless there is the notion of generalised self-efficacy whereby people have optimistic beliefs about coping across a wide range of stressful situations (Luszczynska et al 2005).

Distinctions have been made between different types of phase-specific beliefs. The classification that is most relevant to physiotherapy rehabilitation comes from the health action process approach (HAPA, Schwarzer and Luszczynska 2008). The HAPA posits that during a health behaviour change, such as adopting a regular exercise programme, there are three forms of self-efficacy beliefs. The first is task self-efficacy in which the people are confident about their ability to do the exercises. Second, maintenance self-efficacy is about being confident about maintaining the exercise programme over the long term and being able to overcome possible barriers to doing it, such as bad weather, not enough time, and forgetfulness. Third, recovery self-efficacy is the confidence people have restarting the programme after a lapse in their exercise behaviours, which may have occurred as a result of illness or holidays.

Bandura (1997b) explained four major sources of self-efficacy. The first is performance accomplishments, which is based on experiences of personal mastery, and can be raised by successes and lowered by failures. This occurs in physiotherapy when during their rehabilitation, patients master functional activities that have been previously difficult. Second, vicarious experience may occur when people watch others of a similar age and the same gender perform activities. Bandura (1997b) bases vicarious learning on watching others performing threatening activities without experiencing any adverse effects. This source of self-efficacy can be used with physiotherapy patients by getting them to watch others with a similar set of symptoms successfully exercising without any adverse effects. Third, verbal persuasion occurs when people are led to believe that they will be able to cope with the activity. This is considered to be a weaker source of self-efficacy than those that originate from personal accomplishments (Bandura 1997b). Physiotherapists use verbal persuasion frequently when they provide encouragement to patients who have difficulty with rehabilitation activities. Fourth, emotional arousal comes about when people are fearful of coping in threatening situations, which in turn will affect their self-efficacy in this context. Physiotherapists encounter this when treating people with chronic pain who are unable to do functional activities because of fear avoidance and anxiety.

The use of Behaviour Change Strategies to Bridge the Intention-Behaviour Gap

Generally behaviour change strategies are designed to strengthen peoples' self-efficacy. Making changes to behaviour involves a complex process that includes thoughts or cognitive processes, motivation, emotions, behaviours and changing environmental conditions (Bandura 1997b). This is apparent in daily life with it being quite common for people to not follow through with their intentions or goals. A good example is New Year's resolutions, with most not being implemented (Gollwitzer 1999). Correlations between intentions and behaviour are modest, with intentions only accounting for 20% to 30% of variance in the behaviour (Gollwitzer 1999). A reason for people not following through on their well-meaning intentions is that they do not have the skills to implement them. Nonetheless people who are committed to making changes in their behaviours will persist with making changes even when faced with obstacles (Bandura 1997b). The problems associated with implementing new health behaviours, such as regular exercise, are similar to those encountered with New Year's resolutions. This is evident with the poor rate of adherence to home-based physiotherapy.

A common reason for behaviours not being changed or implemented is that the intention-behaviour gap has to be bridged. For this to happen the intentions or goals need to be explicit, and this can be achieved by specifying strategies that will instigate and maintain the desired behaviours (Schwarzer and Luszczynska 2008, Schwarzer et al 2003). There are a number of behaviour change strategies that can be used successfully to assist patients to bridge the gap and ultimately enhance their physiotherapy rehabilitation adherence. However, not all strategies suit all people and therefore their selection should be based on the patients' preferences, the type of activities, and whether the programmes are primarily clinic- or home-based and if they are long-term or short-term. This process involves identifying the barriers that may hinder the implementation and maintenance of the required behaviours (Gollwitzer 1999). A way of identifying patients' rehabilitation adherence barriers and facilitators is to ask them to list as many as they can think of in 60 seconds, as well as time them to generate the first reason for and against (Cropley et al 2003). If the first reason is a barrier then it is likely that they have not considered following the recommended action (Cropley et al 2003).

The first step in deciding which behaviour change strategies will be suitable for individual patients is to discuss with them strategies they use in their daily lives to remember to keep appointments and/or take medication. The identified strategies may then have to be adapted to suit the content and duration of the patients' physiotherapy programmes. The ultimate aim of educating patients about the use of these strategies is that they can integrate the behaviours into their daily lives such that they become routine (Sluijs and Knibbe 1991). There are a number of behaviour change strategies that have been reported to successfully improve adherence to physiotherapy (Bassett 2006). As adherence to home-based activities is a problem in physiotherapy, the strategies outlined will be applied in this context.

Goal setting is one of the most commonly reported strategies that assists physiotherapy patients to achieve their desired treatment outcomes. For these to be effective they need to be specific, measurable, achievable, realistic and predict a time for successful completion (Cott and Finch 1991, Partridge 1990). Goals are most effective if they are set in collaboration with patients and not dictated by the physiotherapist (Bassett and Petrie 1999). Initially a long-term or global goal should be established taking into account what the patients want to achieve, and possibly modified slightly by the physiotherapist so that the goal is achievable and realistic. As a global goal seems remote, then short-term goals should be set, so that patients achieve the long-term global goal in a staircase fashion (Bassett and Petrie 1999). However there is only limited evidence that goal planning does improve patient rehabilitation adherence (Levack et al 2006). Treatment goals provide the patients with incentives to follow their physiotherapy, but they do not provide the skills necessary for bridging the intention-behaviour gap. Hence once goals have been set, then behaviour change strategies need to be implemented (O'Brien et al 2013).

Four behaviour change strategies use feedback to change behaviours. One is the physiotherapists' feedback about patients' exercise performance and other activities will enable change in behaviours. However this feedback must be honest to assist the correct behaviour being adopted (Meichenbaum and Turk 1987). Second, reinforcement is another form of feedback, which usually leads to the continuation of the correct behaviours (Sluijs and Knibbe 1991). It is most effectively given verbally, with patients being complimented for their achievements and in particular for their adherence to the prescribed activities (Meichenbaum and Turk 1987). Third, feedback resulting from exercise testing has been shown to increase adherence to home-based exercises for people attending cardiac rehabilitation programmes (Ewart et al 1983). As a consequence of the testing, self-efficacy was increased, which in turn was associated with increased home-based physical activity. Once patients know that they are undertaking the physiotherapy activities correctly they can then use self-regulation at home. This involves them regulating their own behaviours and correcting themselves if necessary (Sluijs and Knibbe 1991).

The fourth method of feedback is the use of decision balance sheets, which have been found to be valuable for long-term preventative programmes (Dishman 1991, Geller et al 2012). This is particularly useful for people who are undecided about the benefits of undertaking the recommended activities. People record their anticipated gains and losses from following the recommended activities (Dishman 1991, Geller et al 2012). As people can easily make longer lists of the losses than the gains, it is advisable for them to evaluate each of the losses and gains, as often the short list of gains carries more value than the long list of losses (see Table 1 for an example of a decision balance sheet).

Table 1: Example of a Decision Balance Sheet for Undertaking a Regular Exercise and Walking Programme

Reasons for Exercising Regularly	Reasons for Not Exercising Regularly
It will improve my health	It will be difficult to find time to exercise
It will reduce my weight	I will not be able to walk in bad weather
It will improve my fitness	I may get sore exercising
It will reduce the likelihood of developing chronic disorders.	I will have to buy exercise clothes and shoes
	I will get tired exercising and walking
	I will not be able to fit in my other routine activities

Relapse prevention involves alerting patients to circumstances which may interfere with their treatment programmes, such as days off and being on holiday (Meichenbaum and Turk 1987). This behavioural strategy is also useful for people who do not have daily routines, such as shift workers, and those who travel a lot as part of their employment. Cues are simple strategies that in the initial stages of behaviour change act as reminders for undertaking the activities. At home patients can put exercise equipment, such as balance boards and running shoes, in obvious places. Cue cards kept in noticeable places, such as handbags, wallets, and on dressing tables and desks have been found to be successful (Bassett and Prapavessis 2007). When symptoms are noticeable they can be used as cues (Bassett and Petrie 1999, Sluijs and Knibbe 1991). For example, patients who had restrictions of movement had higher levels of adherence than those whose symptoms had diminished (Bassett and Petrie 1999). Similarly back pain has been reported as a cue to exercise (Sluijs and Knibbe 1991).

Graded activities and booster sessions have been found to improve treatment adherence (Luszczynska et al 2007) and are used for disorders that require long-term self-management, such as osteoarthritis and obesity (Bennell et al 2014, Luszczynska et al 2007, Pisters et al 2010, Veenhof et al 2006). The graded activities are part of a composite programme that consists of progressive activities, education, advice, reinforcement and goal setting and is tailored to suit individual patient's disorders and their needs (Veenhof et al 2006). Once the formal course of treatment has ceased the booster sessions are held at periodic intervals, preferably over the long term, and are designed to revise and upgrade the activities (Veenhof et al 2006). However there is some debate about the success of graded activities and booster sessions, which has occurred with the long-term self-management of osteoarthritis. Pisters et al (2010) and Veenhof et al (2006) found in favour of this method of treatment, whereas Bennell et al (2014) did not. The differences in the findings of the three studies could be due to the number of booster sessions provided, with Bennell et al (2014) only using two sessions, and the other two studies having up to seven sessions over a period of one year. Hence it would appear long-term disorders benefit from more booster sessions over the long-term.

It is generally considered that behaviour change strategies that are theoretically based are superior because their success can be evaluated by the constructs encompassed in the theoretical framework (Sluijs and Knibbe 1991). There are three theoretical frameworks that are of value in physiotherapy. The first is the HAPA (Schwarzer et al 2003), which relies on improving self-efficacy to increase adherence to treatments. It has been tested with cardiac rehabilitation programmes, both in a predictive manner and with its variables being used as an intervention, and found to be successful (Luszczynska and Sutton 2006, Scholz et al 2005). The HAPA is a social cognitive model, but its point of difference to the other models is that it bridges the intention-behaviour gap with the use of action and coping plans. There are two sequential stages in this model, the motivational and the volitional. In the motivational stage, people base their intentions to change behaviours on an awareness of the risks of not implementing them, the expectations of outcomes based on the positive and negative effects of the changes and their perceived self-efficacy about coping with the changes (Schwarzer et al 2003). People who use planning strategies to cope with the activities and to overcome obstacles to their implementation have been found to be more likely to implement the new behaviours (Sniehotta, Schwarzer et al 2005). Once the behavioural intentions are formed, the volitional stage commences in which the behaviours are planned, commenced, maintained and restarted if there are lapses (Sniehotta, Schwarzer et al et al 2005). Self-regulatory processes are required to ensure that the behaviours become habitual and integrated into peoples' daily lives (Conner and Norman 2005, Sniehotta, Scholz et al 2005).

In the O'Brien et al (2013) study participants initially wrote a realistic functional goal that they wanted to achieve by the end of the 12 week exercise programme. Their plans stemmed from the goals and were developed under the guidance of the researcher. The action plans stated specifically when, where, how and if appropriate, with whom they would undertake the activities. An example of the action plans was *I will walk around the park with my sister for 20 minutes on Tuesday and Thursday at three in the afternoon.* For the development of the coping plans participants were asked to think about obstacles that could prevent them from continuing with their new exercise behaviours and attending the exercise classes, and then tabulate each individually. For example, the coping plan for *I do not like walking in the rain* was *I will overcome this obstacle by riding my exercycle for 30 minutes on the days that it is raining*. In addition, plans can be made to overcome lapses in behaviour, and to assist with restarting the recommended activities (Schwarzer et al 2003).

Action and coping plans have been successful in bridging the intention-behaviour gap by assisting people to change their behaviours (Sniehotta et al 2006, Ziegelmann et al 2006). The plans have had some success in physiotherapy, improving physical function of people with osteoarthritis (O'Brien et al 2013). Further the combination of action and coping plans has been found to be more effective than action plans alone (Sniehotta et al 2006), and the planning is even more beneficial if it is done with the assistance of another person (Ziegelmann et al 2006). In addition, action plans are more useful in the early stages of rehabilitation, and coping plans are more valuable over the later stages and following discharge from the formal programme (Sniehotta, Schwarzer et al 2005).

The second framework is the protection motivation theory (PMT) which is a fear appeal model. It posits that the protection motivation is the variable that stimulates people to perform the recommended activity (Rogers 1983). In this model, intentions are formed by two appraisals, threat and coping. The threat appraisal involves people evaluating the seriousness of the problem, such as an injury or disease, and their vulnerability to further problems if they do not take action. The coping appraisal involves people appraising the efficacy of the recommended action, such as treatment and their ability to cope with that action or in other words their self-efficacy (Rogers 1983). The threat and coping appraisal variables have been manipulated successfully in a number of studies, with self-efficacy being shown to have the strongest effect on adherence to the recommended treatment (Milne et al 2000). This model has been used with some success in physiotherapy (Bassett and Prapavessis 2011). In this study, participants were given information about their injury detailing the possible seriousness of their injury; their vulnerability to long-term complications if they did not follow the recommended treatment; the effectiveness of the physiotherapy rehabilitation; and advice about coping with clinic- and home-based treatment. The information significantly increased the participants' perceptions of the threat appraisal variables, and the treatment efficacy but not their coping ability or self-efficacy. However the self-efficacy scores were high, and as most of the participants in this study had been to physiotherapy before, Bassett and Prapavessis (2011) reasoned that this indicated consumer satisfaction and that the participants believed that they could cope with the rehabilitation requirements. The combination of the PMT information and the making of action plans has been found to be significantly effective in encouraging young people to exercise regularly in an effort to prevent myocardial infarction at a later stage of life (Milne 2002).

The third framework is the transtheoretical model (TTM), which is a six stage model. It was originally developed by Prochaska and DiClemente (1983) and has since undergone further development (Prochaska et al 2008). This model provides a basis for a behaviour change strategy by focussing on the process of change as opposed to the determinants of change. While the stages are described sequentially, people may be located in any stage when initiating changes in their behaviour. The sequence of the stages is from precontempation through to termination, and people commencing a behaviour change can be classified at any stage. For the stages of the TTM, and peoples' typical responses for each stage, refer to Table 2, which has based the responses on undertaking regular exercise. By using the assessment tool developed by Cropley et al (2003), the stage of change that people are in can be identified. When applied to exercise programmes, the more reasons given against exercising indicates people are in precontemplation, but as the reasons for exercising increase they are moving into the contemplation and action stages. Table 3 shows the stages of change and the relevant behaviour change strategies. A meta-analysis revealed that (i) self-efficacy increases with the advancing stages of change, (ii) there are greater increases in the use of behavioural strategies from precontemplation to contemplation and (iii) from preparation to action and (iv) the distribution of pros and cons change across the stages (Marshall and Biddle 2001). This model has been applied mostly to long-term exercise programmes.

Table 2: Transtheoretical Model Stages of Change Applied to Regular Physical Activity

Stage of Change	Description
Precontemplation	I am currently not very physically active. I do intend to become physically active in the next 6 months.
Contemplation	I am currently not very physically active, but I am thinking about increasing my level of physical activity in the next month.
Preparation	I am not very physically active, but I am determined to increase my activity in the next month.
Action	I am currently physically active, but I have only begun this activity in the last 6 months.
Maintenance	I am currently quite physically active, and have been so for longer than 6 months.
Termination	I have been physically active for a long time and have no temptation to give up. I am 100% confident that a lapse in behaviour will not occur.

Adapted from: Prochaska et al (2008) The transtheoretical model and stages of change. In: Glanz K, Rimer BK, Viswanath K (Eds) Health behaviour and health education: Theory, research and practice (4th ed.), pp. 97-121.

CONCLUSION

Physiotherapy rehabilitation adherence is problematic, which may be due to the multifaceted nature of these programmes, with patients being expected to undertake a number of different behaviours, such as attend clinic appointments and undertake a range of activities at home. The perceived barriers to adherence seem to operate more strongly than the actual ones. However, self-efficacy has been found to be a particularly strong predictor of treatment adherence, and if this can be strengthened then adherence is likely to improve. On the whole, patients want to adhere to their physiotherapy but they do have difficulty implementing the required behaviours and then integrating them into their lives so they become routine. Patient education alone is not sufficient to enhance treatment adherence, patients need to be given skills to help them adhere to the components of their treatment. Patients' acquisition of these skills may necessitate physiotherapists becoming more aware of behaviour change strategies. Behaviour change strategies have been found to be useful in improving patient adherence to their physiotherapy, because they strengthen self-efficacy and hence patients perceive they can cope with the programme requirements. To ensure that the strategies are effective they must suit the needs of the patients, the activities they are required to undertake and whether the programme is long-term or short-term.

Table 3: Behaviour Change Strategies that Assist Progression through the Stages for Long-term Exercise Programmes

Stage of Change	Behaviour Change Strategies
Precontemplation and Contemplation	Increasing awareness of reasons for exercising, by couching information in PMT framework
	Decision balance sheets
Preparation	Vicarious reinforcement, watching others doing regular exercise
	Thinking about positive reasons for exercise, and visualisation
	Establishing long-term and short-term goals
Action	Setting progressive short-term goals, and associated action and coping plans
	Physiotherapists provide verbal feedback, reinforcement, and graded activities
	Relapse prevention strategies
	Cues
	Self-regulation
Maintenance and Termination	As for Action stage plus booster sessions

Adapted from: Prochaska et al (2008) The transtheoretical model and stages of change. In: Glanz K, Rimer BK, Viswanath K (Eds) Health behaviour and health education: Theory, research and practice (4th ed.), pp. 97-121.

KEY POINTS

- Poor adherence to physiotherapy rehabilitation still persists, despite adherence barriers and facilitators being identified.
- Self-efficacy has a strong impact on adherence and if strengthened, it can facilitate adherence.
- A common reason for rehabilitation behaviours not being implemented is that the intention-behaviour gap is not bridged.
- Behaviour change strategies are valuable for bridging the intention-behaviour gap as they provide patients with skills to integrate the physiotherapy activities into their daily lives.
- Successful behaviour change strategies are verbal feedback, reinforcement, exercise testing, decision balance sheets, self-regulation, relapse prevention, progressed graded activities and booster sessions, and action and coping plans.

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Side-to-side range of movement variability in variants of the median and radial neurodynamic test sequences in asymptomatic people

Stalioraitis V, Robinson K, Hall T (2014) Side-to-side range of movement variability in variants of the median and radial neurodynamic test sequences in asymptomatic people. Manual Therapy 19(4):338-342. doi 10.15619/NZJP/43.3.06. (Abstract prepared by Nick Black)

Objective

To provide a better understanding of the normal asymmetries between left and right elbow range of motion (ROM) during variants of the median and radial upper limb neurodynamic tests (ULNT) in an asymptomatic population.

Methods

Within-subject comparisons of left and right elbow flexion ROM were conducted on 51 asymptomatic participants (26 females, 25 males; mean age 29.7, SD 5.9 years). Range of motion was measured using an elbow mounted electrogoniometer during median and radial ULNTs. The participants were positioned supine with the neck in contralateral lateral flexion and the scapular stabilised in neutral. The arm was then passively positioned in 90° shoulder abduction and external rotation and 90° elbow flexion. The median nerve biased position involved full forearm supination and full wrist/finger extension, while the radial biased position involved full pronation with wrist/finger flexion. The elbow was then passively extended to onset of resistance (R1) and onset of discomfort (P1) in separate tests.

Results

There were no significant differences in mean ROM between sides, with the ROM of one side significantly correlated with the opposite side (median $R^2 = 0.62$, radial $R^2 = 0.85$) for both P1 and R1. Lower bound scores accounting for measurement error and within-subject variability indicate that flexion ROM differences between sides of greater than 15° for the median ULNT and 11° for the radial ULNT could indicate asymmetry beyond normal variation in a similar age-matched population.

Conclusion

The normal variability in ROM observed between sides highlights the need to combine ROM findings with those of symptom provocation and structural differentiation in determining the clinical significance of a median or radial neurodynamic test.

Commentary

Upper limb neurodynamic tests have become a commonly used clinical tool in the assessment and diagnosis of peripheral neuropathic pain. In the absence of central pain mechanisms as the primary cause of symptoms, ULNTs are generally accepted as tests biased towards the mechanosensitivity of nerve roots, brachial plexus and peripheral nerve trunks (Nee et al 2012). A positive test is indicated by (i) reproduction of the patient's symptoms and (ii) structural differentiation via movement of more distal or proximal joints along the path of the nerve, that either aggravate or ease symptoms. A third plausible indicator is a reduction in ROM on the symptomatic side compared to the asymptomatic side (Butler 2000). While ROM asymmetries are commonly accepted as partial indicators of a positive test, only recently has evidence emerged to guide clinicians in the normal asymmetries that may exist between sides (Nee et al 2012). This is pertinent considering asymptomatic subjects can also report symptoms of aching, pain, burning and tingling in response to ULNTs (Nee et al 2012). Therefore, this recent study is worthy of review and may aid clinicians in their interpretation of ULNT ROM findings, helping to avoid false positives and prioritise management.

The clinical relevance of this study is strengthened by its use of therapist-administered variants of ULNTs, without mechanical stabilisers utilised in other similar studies (Van Hoff et al 2012). There are multiple variations for biasing the median, radial and ulnar nerves in ULNTs; however, all require skilled manual handling to ensure the intended neural structure is progressively loaded, thereby achieving an accurate test of the nerves' mechanosensitivity (Butler 2000). In the absence of precise movement and sound patient communication, false tests can easily occur.

If the findings of this study are to be used clinically as a cut-off for potentially normal asymmetry in ULNTs, then the pre-placement of the neck in contralateral lateral flexion and the use of R1 and P1 as end points are important aspects to consider. It is common clinical practice to elicit symptoms with the neck in neutral, then to utilise neck lateral flexion as a sensitising manoeuvre to aid in structural differentiation, especially when suspecting more distal pathology such as carpal tunnel syndrome or radial nerve entrapment (Butler 2000). Contralateral lateral flexion of the neck reduces the ROM available in an ULNT, effectively pre-loading the peripheral neural structures (Coppitiers et al 2001). A previous study of similar design found higher ROM variability when the neck remained in neutral and the end point was marked by 'firm resistance' – 27° and 20° of elbow flexion for the median and radial ULNTs, respectively (Covill and Petersen 2012), compared to 15° and 11°, respectively, in the present study. These findings are not representative of a symptomatic population, however they may suggest that pre-loading the neural structures and stopping at R1 or P1, rather than 'firm resistance' (Covill and Petersen 2012), provides a more accurate representation of ROM differences between sides.

An objective cut-off value indicating when differences in ROM between sides are likely to be a result of pathology would be an ideal clinical measure for interpreting the significance of an ULNT. In addition, this would provide a clear measure of outcome, guiding treatment and aiding in communication with other involved parties, such as employers and insurance providers. In this regard, the values reported in this study should be used cautiously. The use of an electrogoniometer and a relatively young population are the obvious limitations in the clinical value of these findings. In fact, the actual mean differences between sides were not found to be significant. However, consideration of measurement error and within-subject variability revealed potential differences of 15° and 11°. The clinical value of this study should instead be interpreted through the increased understanding that normal asymmetry can exist in upper limb neurodynamics. As a result, ROM findings need to be coupled with symptom provocation and structural differentiation for a ULNT to be interpreted as a positive sign of peripheral neuropathic dysfunction.

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Do stingers affect scapular kinematics in rugby players?

Kawasaki T, Maki N, Shimizu K, Ota C, Urayama S, Moriya S, et al (2014) Do stingers affect scapular kinematics in rugby players? Journal of Shoulder and Elbow Surgery 23(12):e293–e299. doi 10.15619/NZJP/43.3.07 (Abstract prepared by Sharada Murty)

Abstract

Aim: The rationale of this study was to investigate shoulder examination findings that are associated with scapular dyskinesis. This cross-sectional epidemiological study investigated the hypothesis that upper limb nerve traction injuries ('stingers') alter scapular kinematics in high-school rugby players.

Methods

One hundred and sixty-five male Japanese high-school rugby players, without previous shoulder or elbow surgery or injury within the past month were recruited. Demographic data, including level of competition and injury history, were collected via a questionnaire. Three examiners (medical doctors) blinded to subjective data, completed physical examinations of both shoulders of each participant which included assessment of impingement, instability, shoulder girdle muscle strength, posterior capsular tightness and palpation of the acromio-clavicular joint. Examiners evaluated scapular kinematics through video analysis and classified the type of scapular movement observed using the scapular dyskinesis test (4-type method).

Results

Analysis of inter-rater reliability of assessment of scapular dyskinesis showed moderate reliability. Six subjects were excluded from further analysis as there was a lack of consensus on their classification. Of the 159 remaining players, 16 demonstrated scapular dyskinesis. Of these, 13 were classified as Type I dyskinesis and three exhibited Type III dyskinesis. Statistical analysis of the relationship between scapular dyskinesis and each of the examination findings demonstrated a significant association of Type I scapular dyskinesis with previous history of stingers.

Conclusion

There is a significant association between Type I scapular dyskinesis and previous history of stingers in male high-school rugby players. The scapular dyskinesis test using the 4-type method is moderately reliable in measuring altered scapular motion.

Commentary

Abnormal scapular kinematics or scapular dyskinesis is associated with shoulder pathology including impingement, instability and acromio-clavicular joint injury (Kibler et al 2013). Identification of factors that may influence scapular dyskinesis is important to establish appropriate injury prevention and rehabilitation protocols. However, evaluation of scapular dyskinesis necessitates a reliable method of assessment.

The authors of this paper have previously hypothesised that nerve traction injury to the shoulder results in scapular dyskinesis of the injured side (Kawasaki et al 2012). They suggest altered scapular dyskinesis may be due to neurological impairments and resultant disruption to neuromuscular coordination of scapular motion caused by traction to neural tissue. In this study, male high-school rugby players were assessed to identify findings related to the shoulder which may be associated with altered scapular kinematics (which were observed, recorded by video and analysed by three examiners). Each examiner reported the presence or absence of scapular dyskinesis and categorised scapular movement patterns observed during shoulder flexion and abduction while the participant was holding a 3kg weight.

There are various recommendations for the assessment of scapular dyskinesis in the literature. Many of the assessment methods utilised clinically use a two-dimensional model to assess three-dimensional scapular motion. Despite this, there is consensus surrounding the use of the scapular dyskinesis test (referred to in this study as the 4-type method), which is reliable and easily adminstered clinically (Kibler et al 2013). Scapular movement is classified as: Type I, raising of the inferior angle of the scapula; Type II, raising of the length of the medial border; Type III, elevation of the superior border; Type IV, normal (Kibler et al 2013). Visual observation of scapular movement and determination of the presence or absence of dyskinesis is noted.

A multivariate analysis was used to evaluate the association between scapular dyskinesis and assessment findings. Only Type I scapular dyskinesis revealed a sample large enough to allow statistical analysis, with a significant association reported between Type I scapular dyskinesis and previous history of a stinger in high-school rugby players. This association has also been reported in adult rugby players (Kawasaki et al 2012, Vaccaro et al 2002). The authors of this study suggest that stingers cause scapular dyskinesis. As with other shoulder pathology there is strong evidence of the presence of altered scapular kinematics in players with a history of nerve traction injury but it is not evident whether this is a cause of pathology or the result of it (Kibler et al 2012). It is likely that many factors contribute.

Nerve traction injury affecting the upper limb is a common injury in collision sports, reported to occur in up to 50% of players (Vaccaro et al 2012). Symptoms are due to either traction of the brachial plexus or C5/6 nerve root causing shooting pain and/or paraesthesia down the arm to the hand (Kawasaki et al 2012). Weakness may or may not occur and symptoms usually last minutes or hours, and very rarely more than a day. Due to the usually transient nature of symptoms, players may not seek assessment or treatment before return to sport. The guidelines for return to play following a stinger injury include complete resolution of symptoms, return to baseline range of motion and strength (Vaccaro et al 2012). Despite following these guidelines, exacerbation of symptoms often occurs with relatively minor secondary trauma. The results of this study suggest that it is also important to assess scapular mechanics, and rehabilitation programmes should correct scapular dyskinesis before return to sport.

This study provides evidence for reliable methods of assessment of scapular dyskinesis. The authors report a clear association between nerve traction injury and altered scapular kinematics. Clinically, the findings of this study suggest assessment of scapular motion is important following stinger injury. Rehabilitation including strategies to restore normal mechanics before return to sport may minimise further injury.

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Clinical Imaging with Skeletal, Chest and Abdominal Pattern Differentials

Third Edition. Dennis M Marchiori 2014. Elsevier, St Louis. ISBN 978-0-323-08495-6. Hard Cover. Recommended retail price $263.15. doi 10.15619/NZJP/43.3.08

This is an updated and revised third edition of this text, which is aimed at covering medical imaging for health science students and health professionals. The size of the text, with over 1460 pages, gives an indication of the comprehensive nature of the included material. There are no additional chapters in this new edition but there are over 800 new or replacement images as well as updated references.

The first part covers an introduction to imaging with plain film imaging, followed by specialised imaging, which includes magnetic resonance imaging, computerised tomography and radionuclide imaging. The focus is on plain film imaging with less emphasis on other forms of specialised imaging. Digital imaging is briefly described, which could have been expanded upon, especially given most imaging these days is in digital format. Radiographic positioning is also covered, which is relevant for radiography students, as well as roentgenometrics, film interpretation, report writing and normal anatomy and variants.

Bones, joints and soft tissues are included in Part 2, which is pertinent for musculoskeletal physiotherapists, as it incorporates a broad range of diseases, traumas and infections. Much of the terminology used is reflective of the target audience, with the use of American spelling and a section indicating the classification scheme of chiropractic subluxation. The section on arthritides contains recent and reasonably detailed information on inflammatory conditions such as rheumatoid arthritis, which includes the most recent 2010 classification criteria.

Parts 3, 4 and 5 detail imaging of the chest, abdomen, brain and spinal cord respectively. These sections would be of interest to a clinician working in an acute care setting. The traditional process of providing an image that is representative of a disease is replaced with a format designed to allow the reader to engage in analysing the images in a more clinical manner, by using pattern recognition to determine potential differential diagnoses. The online material, which is available with a scratch code, includes case studies and flash cards for the student and examinations and images which are able to be used by course instructors.

Overall this is a reasonably comprehensive text, which caters to a wide range of health science students and clinicians. The scope of this text is however broad, which means that some content areas are less detailed than others. There are many imaging texts available but for a musculoskeletal physiotherapy student looking for a smaller text which covers musculoskeletal imaging, an alternative would be *Diagnostic Imaging for Physical Therapists* (Swain & Bush, 2008). A similar alternative text which covers all regions of the body and which has previously been recommended to medical students is *Squire's Fundamentals of Radiology* (Novelline, 2004).

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