

# Rehabilitation RESEARCH REVIEW™

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Issue 63 – 2023

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### Abbreviations used in this issue

CI = confidence interval  
COPD = chronic obstructive pulmonary disease  
HRQoL = health-related quality of life  
QoL = quality of life  
RCT = randomised controlled trial  
RR = relative risk  
TBI = traumatic brain injury

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## Welcome to issue 63 of Rehabilitation Research Review.

A systematic review from Australia and New Zealand found that social support is considered in cardiac care decisions after a cardiac event and identified evidence that lower social support may be associated with higher-intensity healthcare services and poorer survival. In a Chinese study we discover a promising mobile application-based rehabilitation programme for patients undergoing unilateral total hip or knee arthroplasty. Other topics covered in this issue include exercise for post-concussion symptom rehabilitation, virtual reality interventions for post-concussion rehabilitation, physical activity effects after moderate-to-severe traumatic brain injury, effective teams in vocational rehabilitation, and New Zealand adults' attitudes towards digital health interventions.

I hope that you find the information in this issue useful in your practice and I welcome your comments and feedback.

Kind regards,

Professor Nicola Kayes

[nicolakayes@researchreview.co.nz](mailto:nicolakayes@researchreview.co.nz)

## Social isolation and social support influence health service utilisation and survival after a cardiovascular disease event: A systematic review

Authors: Freak-Poli R et al.

**Summary:** This systematic review assessed associations between social isolation, low social support, and loneliness, and the utilisation of health services and survival after a cardiovascular disease (CVD) event in Australia and New Zealand based on 25 studies including 10-12,821 participants. Greater social support was associated with better outcomes on four of five themes (destination at discharge, attendance at outpatient rehabilitation, rehospitalisation, survival), but there were no assessments of length of inpatient stay. Positive social health was associated with discharge to higher independent living. Partner status and living status did not align with social isolation and social support. This review found that social health is considered in cardiac care decisions and in how healthcare is delivered (i.e., outpatient, rehabilitation, or nursing home).

**Comment:** I selected this paper for review as it covers an important issue relevant to the rehabilitation of people grappling with significant injury or illness – social health. In this paper the authors broadly conceptualise social health to include one's engagement in meaningful relationships, ability to adapt to social situations and social support. Despite this broad conceptualisation most of the evidence reviewed drew on relatively crude indicators such as partner status and living situation. Another common downfall of literature in this area is that it often privileges quantity of relationships and social interactions over quality. So, when you are drawing from literature in this space it is worth looking at the measures they are using as a proxy indicator of social health, so you are clear on what aspects of social health they are tapping into. This specific paper positioned social health as an independent variable to explore its relationship with healthcare utilisation (as the dependent variable). Many of the findings are somewhat intuitive and perhaps not a surprise. However, if we acknowledge that all persons are inherently social and relational beings, and that social health is a key aspect of well-being, then social health shouldn't only be of interest because of its relationship with other outcomes, but because it is a critical outcome in and of itself.

Reference: *Int J Environ Res Public Health* 2023;20(6):4853

[Abstract](#)

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## Taking charge after acute exacerbation of chronic obstructive pulmonary disease: A randomized controlled feasibility trial of a psychologically informed self-management intervention

**Authors:** Levack WMM et al.

**Summary:** This New Zealand prospective, parallel group randomised trial examined a modified version of the Take Charge programme (talk therapy that encourages a sense of purpose, autonomy, mastery, and connectedness with others) in 56 people (71% European, 61% female, mean age 70 years, 89% non-smokers) after admission to hospital with acute exacerbation of COPD (AECOPD) and the potential for improvement in self-reported limitations, health-related quality of life (HRQoL) and future hospitalisation. The Charlson Comorbidity Index mean score was 2.3, suggesting mild to moderate comorbid severity. Over 12 months after index admission, Take Charge participants had 85 moderate or severe AECOPD episodes and the control group had 84 episodes (RR 0.93; 95% CI 0.69-1.26). COPD Clinical Questionnaire scores were better in Take Charge participants (mean difference -1.26; 95% CI -2.06 to -0.45).

**Comment:** I have previously reviewed papers on the Take Charge after stroke intervention. If you want a refresher on the intervention and access to published papers and other resources, you can find out more [here](#). The aim of this study was to test the acceptability and feasibility of Take Charge for people with AECOPD. The beauty of Take Charge is that it is delivered in a single 60-to-90-minute session (so a low cost, low intensity intervention!). In this case, it was delivered by a trained facilitator (5-day training programme with access to ongoing training and feedback sessions) to people in their homes following discharge from hospital for AECOPD within 2 weeks of discharge. The findings highlight the complexities of undertaking a trial with this population who have severe illness, with only 59% of those randomised contributing self-reported data at 12 months. The temptation would be to abandon working with this more severe group in favour of those with milder illness. However, the authors make several recommendations to inform future trial design. While the feasibility findings regarding impact on AECOPD rates are complex, the authors suggest the findings related to the Clinical COPD Questionnaire show promise for a positive impact on HRQoL and are compelling enough to progress to a fully powered definitive trial.

**Reference:** *Int J Chron Obstruct Pulmon Dis.* 2023;18:317-325

[Abstract](#)

## The effectiveness of a mobile application-based programme for rehabilitation after total hip or knee arthroplasty: A randomised controlled trial

**Authors:** Wang Q et al.

**Summary:** This Chinese, randomised controlled trial (RCT) examined effectiveness of rehabilitation using a mobile application in 86 patients after unilateral total hip or knee arthroplasty. After hospital discharge, intervention recipients had improvements after 6 weeks versus control recipients in self-efficacy scores (adjusted mean difference [AMD] 0.72; 95% CI 0.31-1.14;  $p < 0.001$ ) and patient-reported physical function (AMD 4.57; 95% CI 1.24-7.90;  $p = 0.007$ ); self-efficacy differences were probably clinically significant. After 10 weeks, intervention recipients had improvements in self-efficacy (AMD 0.64; 95% CI 0.33-0.95;  $p < 0.001$ ), HRQoL (AMD 0.06; 95% CI 0.01-0.10;  $p = 0.018$ ), anxiety (AMD -0.51; 95% CI -0.91 to -0.10;  $p = 0.015$ ), and depression (AMD -0.37; 95% CI -0.66 to -0.08;  $p = 0.012$ ); the self-efficacy and HRQoL differences may be clinically significant.

**Comment:** Research seeking to explore the potential of mobile application-based rehabilitation has proliferated in recent years. The authors of this paper argue their point of difference to be: a) a theoretically-informed mobile application; and b) an explicit focus on psychological outcomes (versus a sole focus on physical function and symptom alleviation). The two theories underpinning app development included Bandura's self-efficacy theory and the Illeris model for learning. I admit that I had not heard of the Illeris model before, so I had to look that up to find out more about it. In brief – it argues that a person's learning can be promoted through three dimensions: content (what is learned - knowledge, skills, understanding), incentive (mental energy - motivation, emotion, volition), and interaction (impulses that initiate the learning process - action, communication, cooperation). I need to dive into this further to fully understand the theory and its application, but at first glance the central tenets of this model resonate with behaviour change theory and I suspect it has potential for wider application in rehabilitation. The findings show promise, particularly for self-efficacy, anxiety, depression and HRQoL. The authors argue for the development of mobile apps in rehabilitation which incorporate emotional support functions. I would argue that this should be a core component of all rehabilitation programmes – whether app-based or not.

**Reference:** *Int J Nurs Stud.* 2023;140:104455

[Abstract](#)

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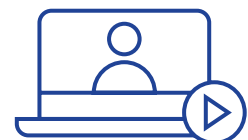
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## Exercise parameters for postconcussion symptom rehabilitation: A systematic review

**Authors:** Jaganathan KS et al.

**Summary:** This systematic review assessed unimodal exercise interventions for post-concussion symptoms (PCS) in adolescent athletes based on seven RCTs. Exercise was more beneficial than control conditions in two studies of acute PCS and two studies of persistent PCS. Within-group differences identified symptom improvements over time in all studies. There was general support for programmed exercise commencing after an initial rest period of 24-48 hours. Recommendations for further research on exercise parameters include progressive aerobic exercise initially of 10-15 minutes at least four times a week, at an intensity of 50% of the sub-symptom heart rate threshold.

**Comment:** While the authors acknowledge the evidence and potential for exercise to form part of a multimodal intervention, they argue that we need to understand the unique and specific effects of exercise as a unimodal intervention to ensure optimal design of the exercise intervention. As such, this systematic review aimed to synthesise findings from RCTs to inform exercise parameters for post-concussion syndrome. They drew on the FITTT principle – frequency, intensity, time (duration), type, time post injury – as a framework for data extraction. The result is a specific set of parameters that the authors argue could form the basis for future research. It is important to progress with caution given variability in intervention parameters and outcome measures in included studies.

**Reference:** *J Sport Rehabil.* 2023;Mar 20 [Epub ahead of print]

[Abstract](#)

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## Virtual reality-based interventions for the rehabilitation of vestibular and balance impairments post-concussion: A scoping review

**Authors:** LeMarshall SJ et al.

**Summary:** This scoping review aimed to identify, synthesise, and assess studies reporting on the effectiveness of virtual reality (VR) for post-concussion rehabilitation of vestibular and balance impairments and included three RCTs, three quasi-experimental studies, three case studies, and one retrospective cohort study. VR was an effective tool for post-concussion rehabilitation of vestibular and balance impairments, but there was a low level of evidence, and research to establish a quantitative standard and appropriate dosage of VR interventions is required.

**Comment:** This scoping review provides a good overview of existing evidence for VR interventions for the rehabilitation of vestibular and balance impairments post-concussion. Overall, the trend is in favour of VR interventions having a positive impact on outcomes. However, I would promote caution in interpreting the findings given that: a) the synthesis did not provide information about statistical significance of pre-post changes; b) overall, the quality of included evidence was relatively low; and c) there was no detail provided regarding impact of VR compared to more conventional vestibular rehabilitation (or other active interventions for that matter). It is worth noting that seven of the ten included papers used a semi-immersive VR environment, all using a computer-assisted rehabilitation environment (CAREN). As such, it is worth noting that the reported findings primarily relate to that specific type of VR rehabilitation set up. Regardless, if this is an area of rehabilitation you are working in, I would recommend reading the paper to get your own sense of the evidence base. The paper includes a rich discussion of findings which may offer some useful insights for practice, drawing on the wider VR evidence base.

**Reference:** *J Neuroeng Rehabil.* 2023;20(1):31

[Abstract](#)

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## The effect of physical activity on health outcomes in people with moderate-to-severe traumatic brain injury: A rapid systematic review with meta-analysis

**Authors:** Johnson L et al.

**Summary:** This rapid systematic review and meta-analysis examined the effect of physical activity on health outcomes in people with moderate-to-severe TBI, for the purpose of adapting World Health Organization physical activity guidelines into clinical practice guidelines, based on 23 studies including 812 participants (36% female, post-TBI time 56 days to 16.6 years). Physical activity interventions were evaluated in 12 rehabilitation studies, eight community studies and three home-based studies, with pooled data for eight outcomes (composite mobility, walking speed, balance, cardiorespiratory fitness, body composition, fatigue, quality of life, mood). There was an uncertainty of effect of physical activity on mobility, including walking speed and balance, cardiorespiratory fitness, fatigue and QoL in people with moderate-to-severe TBI, and little evidence of improvements being maintained at follow-up. Many of the studies were of moderate to high quality, but with small sample sizes, diverse comparators and a range of outcome measures, that made it impossible to draw definitive conclusions on the effects on physical function, cognition and quality of life. A virtual reality intervention improved Community Balance and Mobility Scale scores more than standard balance training (MD 2.78; 95% CI 1.40-4.16).

**Comment:** We don't tend to question the protective effects of physical activity for health in the general population, and for most (though not all) people living with a long-term condition or experiencing disability. However, in the context of TBI, which has been routinely treated as an acute injury, our energy is often so focused in reducing brain injury-related symptoms that we often overlook health-promoting behaviours such as physical activity. That is why I thought this paper was a refreshing read. Synthesising evidence to determine the effect of physical activity on health outcomes in this population helps to shift the focus from brain injury as an acute event to brain injury as a long-term condition – and living well with brain injury as a key outcome of interest. Sadly, the findings are that more research is needed, largely due to methodological limitations of the existing evidence base and high variability in outcome measures making pooling data for the purpose of meta-analysis difficult. Nonetheless, I hope this review provides the platform for ongoing research in this space.

**Reference:** *BMC Public Health* 2023;23(1):63

[Abstract](#)

## Recovery curve for patient reported outcomes and objective physical activity after primary total knee arthroplasty – A multicenter study using wearable technology

**Authors:** Christensen JC et al.

**Summary:** This study assessed recovery trajectory based on patient reported outcomes (PROs) and physical activity measures during 12 months after total knee arthroplasty in 1005 participants. At 1 month, Knee Injury and Osteoarthritis Outcome Score for Joint Replacement (KOOS JR), EuroQol-5D (EQ-5D) and steps per day were improved compared to pre-operative scores ( $p < 0.05$ ), while flights of stairs per day, gait speed and walking asymmetry declined (all  $p < 0.001$ ). By 6 months, all scores improved (all  $p < 0.01$ ). The most clinically important differences were observed at 3 months, including KOOS JR ( $\beta$  18.1; 95% CI 17.2-19.0), EQ-5D ( $\beta$  0.11; 95% CI 0.10-0.12), steps per day ( $\beta$  1169.3; 95% CI 1012.7-1325.9), gait speed ( $\beta$  -0.05; 95% CI -0.06 to -0.03), and walking asymmetry ( $\beta$  0.00; 95% CI -0.03 to 0.03).

**Comment:** This is an interesting study exploring recovery trajectory over 12 months following total knee arthroplasty. The authors argue that this adds to existing literature given they use patient-reported outcomes and objective measures of physical activity to capture activity in real-world conditions, rather than relying on clinical indicators of recovery. The authors refer to perceived physical activity measures throughout this paper. However, it is important to note that the measures used (KOOS JR, EQ-5D) are not measures of physical activity per se. Rather, they are measures of function and capture perceived difficulty with key aspects of functioning. It is worth keeping this in mind when interpreting the findings. Nonetheless, the findings offer useful insights into recovery trajectories over 12 months. The authors didn't reflect too much on the subtly different trajectories between the self-reported (greatest magnitude of improvement in first 3 months) and objective (slower recovery trajectory) measures. I wondered if this might reflect a delay in the transfer of improvements in function (capacity) to behaviour (participation), but this would need further exploration. It would also be interesting to explore whether these trajectories could be used as a reference point to explore how different rehabilitation inputs impact observed trajectories.

**Reference:** *J Arthroplasty* 2023;38(6S):S94-S102

[Abstract](#)

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## Effective teams in vocational rehabilitation: An exploration of complexities and practice in Aotearoa-New Zealand

**Authors:** McAulay L et al.

**Summary:** This qualitative study examined factors including funding systems, team structure, policies and procedures, and effects of professional hierarchies that interact to produce problems in inter-disciplinary vocational rehabilitation teamwork in the Aotearoa-New Zealand context and developed solutions. Reflexive thematic analysis identified three major themes: 'having the power', 'being human', and 'vocational rehabilitation is not for everyone'. The primary goal is achieving trusting relationships within the team by seeing everyone as equal and as human. Equality was particularly important for professionals who occupy different positions of power in wider professional hierarchies. Vocational rehabilitation specialist skills, including experience and postgraduate qualifications, were often under-recognised, providing little power in vocational rehabilitation decision-making processes.

**Comment:** For context, recruitment in this study focused on vocational rehabilitation teams predominantly working with clients who have musculoskeletal injury preventing their ability to work. The findings are perhaps not surprising, and I am sure they will resonate for people working in vocational rehabilitation. "Having the power" referred to specialist vocational rehabilitation practitioners feeling undermined in the context of a system where the decision-making power remains with the medical profession (with general practitioners ultimately responsible for provision of medical certificates) who they perceive don't always value their vocational rehabilitation skills and knowledge. "Being human" reflected calls for a focus on team members as people. In participant's experiences, this could break down barriers, hierarchies, and role boundaries. In taking these two themes together, I am reminded of the broader literature which has explored medical certification practices in primary care. It highlights contrasting experiences for general practitioners where several factors contribute to their decision making, including contextualising that decision in the context of their long-term relationship with patients as their primary care provider. In that sense, it is a very human decision, drawing on a complex interplay of factors including but not limited to the recommendations of their vocational rehabilitation colleagues. I support "Being human" as a key step in collaborative team working. Embedding collaborative ways of working that enable a deep, reciprocal, and contextualised understanding of the thinking, feeling, and doing of different team members would better enable us to harness the skills, experience and knowledge of each to the benefit of clients.

**Reference:** *J Occup Rehabil.* 2023;Apr 6 [Epub ahead of print]

[Abstract](#)



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## Experience of a cognitive behavioural therapy and mindfulness intervention for men with a history of traumatic brain injury in prison: A thematic analysis

**Authors:** Theadom A et al.

**Summary:** This Aotearoa-New Zealand study examined a 10 session, group-based, cognitive behavioural therapy (CBT) and mindfulness intervention in 36 adult men in prison with a history of TBI. Based on post intervention interviews with 17 participants, four themes were identified; journey into jail, learning from others, new understandings, and developing new ways of coping. The intervention allowed improved self-understanding, greater acceptance of their difficulties and feelings of hope through learning new ways to respond to life situations. Suggested improvements included increased breaks, discussion of wider TBI implications and a follow-up session.

**Comment:** This specific paper reports on the qualitative arm of a New Zealand-based mixed-methods pilot randomised clinical trial. The findings from the quantitative arm have been reported elsewhere if they are of interest to readers ([Mitchell T et al., Clin Rehabil. 2021;35\(8\):1185-1195](#)). While the quantitative findings were modest, the qualitative findings provide insights into the benefits of the intervention for participants including but not limited to: the therapeutic value of group-based interventions through peer support and sharing of experience; and exposure to tools and techniques which could be easily applied in daily life to better manage their response to challenging situations. The authors note that the findings identified meaningful outcomes that were not well reflected in the quantitative measures used in the pilot trial. This is an important finding which could be formative to future trial design. It also highlights the value of using a mixed methods design. Trials can be inherently limited by what we can and do measure, and so putting a qualitative component alongside that can offer rich and unique insights into intervention outcomes that may otherwise be overlooked.

**Reference:** *J Forensic Psychiatr Psychol.* 2023;Mar 23 [Epub ahead of print] [Abstract](#)

## Will they or won't they? Understanding New Zealand adults' attitudes towards using digital interventions

**Authors:** Wilson H et al.

**Summary:** This Aotearoa-New Zealand mixed-methods study examined Kiwi adults' attitudes towards digital interventions that deliver healthcare via internet or smartphone applications to support wellbeing and health. A cross-sectional survey and semi-structured interviews showed varied and complex attitudes towards digital interventions that were influenced by group membership and the scenarios in which the digital interventions become available. These attitudes were influenced by beliefs about benefits and concerns with digital interventions, knowledge, views of others, and previous experience and confidence.

**Comment:** While this paper is not specific to rehabilitation, I chose to include it in this issue of Rehabilitation Research Review given it may offer important insights into the uptake of digital interventions in rehabilitation. The authors argue digital interventions to be one subtype of eHealth and define it as the delivery of structured health programmes via the internet or smartphone applications. They argue that understanding New Zealand attitudes to digital interventions is important before investing significant resource in their development and implementation into routine healthcare in the New Zealand setting. There are quite a few findings to digest in this paper so if this is an area of interest for you, it is worth reading it in full. There are many nuances to unpack! The authors describe attitudes to digital interventions as *complex and ambivalent* which is a fair summary. There was a sense that digital interventions would be most suited for addressing mild health issues, but less acceptable for addressing moderate, severe, or high-risk conditions. This would itself be interesting to unpack – who defines what constitutes 'severe' in this context for example? The qualitative findings provide some useful reflections on perceived risks associated with digital interventions which may need to be mitigated (e.g., may be easier to avoid health problems when engaging with a digital intervention compared to engaging in person with a health professional, not having a safety net, and privacy and security concerns). On the other hand, there were several facilitators cited which could be bolstered to optimise the conditions for positive engagement with digital interventions. My take home for rehabilitation practitioners exploring the use of digital interventions in practice: Attitudes are complex and varied and so taking the time to understand client perspectives and experiences of digital interventions is critical to inform a more tailored approach to their use alongside conventional rehabilitation interventions.

**Reference:** *Front Digit Health* 2023;5:1008564 [Abstract](#)

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### Independent commentary by Professor Nicola Kayes



Professor Nicola Kayes is Director of the Centre for Person Centred Research at Auckland University of Technology. Nicola has a background in health psychology and as such her research predominantly explores the intersection between health psychology and rehabilitation. She is interested in exploring the role of the rehabilitation practitioner and their way of working as an influencing factor in rehabilitation and whether shifting practice and the way we work with people can optimise rehabilitation outcomes. Nicola actively contributes to undergraduate and postgraduate teaching in rehabilitation at the School of Clinical Sciences at Auckland University of Technology.

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