CFAHR Evidence Brief

In-bed cycling with critically ill patients in Intensive Care

Authors and Affiliations

Marc Nickels[1,2,3], Leanne Aitken[4,5], Adrian Barnett[2], James Walsham[1,6], **Steve McPhail**[2,3,7]

[1] Princess Alexandra Hospital, Metro South Hospital and Health Service
[2] Australian Centre for Health Services Innovation and Centre for Healthcare Transformation, School of Public Health and Social Work, Queensland University of Technology
[3] Centre for Functioning and Health Research, Metro South Hospital and Health Service
[4] School of Health Sciences, University of London
[5] Menzies Health Institute Queensland, Griffith University
[6] School of Medicine, The University of Queensland
[7] Clinical Informatics, Metro South Hospital and Health Service

Funded by: Metro South Health Study, Education and Research Trust Account (SERTA)

Alignment with *Metro South Health Research Strategy* 2019 - 2024

☐ Build research capability

☒ Increase research capacity

☒ Embed research in clinical services

☒ Translate research to better health

☐ Research excellence

Alignment with *Allied Health Research Capability & Development Strategy* 2017 - 2020

☐ Engage staff as research consumers

☒ Enable staff as research generators

☒ Build research-enabling infrastructure and strategic processes

☒ Strengthen leadership in research and innovation

☐ Enhance internal research collaboration and synergy

☒ Strengthen partnerships with consumers and external stakeholders

Alignment with *Allied Health Research Capability & Development Strategy* 2017 - 2020

☐ Standard 1 – Clinical Governance

☐ Standard 2 – Partnering with consumers

☐ Standard 3 – Preventing and controlling healthcare-associated infection

☐ Standard 4 – Medication safety

☒ Standard 5 – Comprehensive care

☐ Standard 6 – Communicating for safety

☐ Standard 7 – Blood management

☐ Standard 8 – Recognising and responding to acute deterioration

Practice Issue

Individuals who survive a critical illness commonly experience long-term changes to their physical functioning. There is evidence to support the use of exercise during critical illness to reduce these long-term effects on physical health, however there are barriers to the implementation of early exercise in this clinical population. In-bed cycling is a method of exercise that may overcome these barriers. In-bed cycling involves a specially designed cycle ergometer that can be positioned at the end of a patient's bed, allowing the feet to connect to the pedals, whilst the patient is in a supine position. The acceptability, safety and feasibility of delivering the in-bed cycling training has not been robustly established.

Evidence

A two-arm parallel phase II randomised controlled trial was conducted at the Princess Alexandra Hospital usual care plus additional in-bed cycling sessions versus usual care with critically ill adults. Participants who completed in-bed cycling may have an improved trajectory of recovery. Patient who cycled experienced less thigh muscle wasting in comparison to walked further one week following intensive care discharge and spent 3 days less in the acute hospital following ICU discharge in comparison to patients who did not cycle. However, the results did not achieve statistical significance in the sample analysed.

An evaluation of acceptability, safety and feasibility of in-bed cycling was also imbedded in Thirty-six patients received the in-bed cycling training, which occurred on 6 of 7 days per week, for 30 minutes. Patients reported the in-bed cycling was highly acceptable, and perceived a benefit to their feelings of well-being. No serious adverse events occurred, demonstrating the intervention was safe. More than 90% of the planned cycling sessions were delivered, supporting the feasibility of the exercise technique.

Practice Change

In-bed cycling is now an accepted exercise therapy modality within the Intensive Care Unit at Princess Alexandra Hospital. The uptake of the therapy has promoted a culture of early mobility across the multidisciplinary team within the unit.

Publication/s

1. Nickels MR, Aitken LM, Walsham J, Barnett AG, McPhail SM. Critical Care Cycling Study (CYCLIST) trial protocol: a randomised controlled trial of usual care plus additional in-bed cycling sessions versus usual care in the critically ill. BMJ Open 2017;7:e017393. doi: 10.1136/bmjopen-2017-017393
2. Nickels MR, Aitken LM, Barnett AG, Walsham J, McPhail SM. Acceptability, safety, and feasibility of in-bed cycling with critically ill patients. Australian Critical Care, 2020;33(3):236-243.
3. Nickels MR, Aitken LM, Barnett AG, Walsham J, King S, Gale N, Bowen A, Donaldson S, Peel B, Mealing S, McPhail SM. Effect of in-bed cycling on acute muscle wasting in critically ill adults: A randomised clinical trial. Journal of Critical Care (Accepted 24/05/2020)

Adapted from Tilley Pain (Townsville HHS)
Based on the Australian Healthcare and Hospitals Association's Health Policy Evidence Brief
Metro South Health Research Strategy 2019 – 2024 https://qheps.health.qld.gov.au/__data/assets/pdf_file/0012/2325000/research-strategy.pdf
Allied Health Research Capability & Development Strategy 2017 – 2020 https://metrosouth.health.qld.gov.au/sites/default/files/allied-health-research-strategy.pdf
National Safety and Quality Health Service Standards https://www.safetyandquality.gov.au/sites/default/files/migrated/Overview-of-the-NSQHS-Standards-second-edition.pdf