**CQU Ethics Protocol – Taking the plunge – combined pain education with a learn to swim program for low back pain.**

**The problem**

Low back pain (LBP) is a major global public health problem and has been the leading cause of activity limitation and disability worldwide for the past 30 years (1). In fact, most of the social and economic costs related to LBP are due to people experiencing sustained disability, developing persistent LBP (2). This global public health problem is unlikely to go away, with recent research projecting more than 800 million prevalent cases of low back pain by 2050 (3).

In addition to the high societal and individual burden, there is growing concern of an epidemic of poor care for this condition and that common management practices for LBP are not meeting the needs of people with LBP (4). Persistent low back pain is widely considered a complex multifactorial biopsychosocial condition (2). Moreover, genetic factors and comorbidities also play a role and contribute to the problem (2). As such, there are calls to more comprehensively manage LBP for recovery (5).

**Previous literature addressing this problem or identifying a gap.**

While most episodes of LBP recover quickly, 20–30% develop persistent LBP, dominated by high levels of disability (6). In Australia, 1 in 6 people report having LBP (7), and is a leading contributor of musculoskeletal disease burden (3). High quality clinical practice guidelines for LBP recommend self-management via education, physical activity and exercise as first line care (8). Evidence shows pain education and exercise combined is superior to pain education alone (9). Further, all forms of exercise are effective for persistent LBP (10). It is theorised that exercise reduces pain and improved function via several mechanisms, including neuro-physiologic (i.e., reduced inflammation), and cardiometabolic (i.e., improved fitness) mechanisms. More commonly cited mechanisms include mechanical aspects such as improved muscle strength or endurance, flexibility, range of motion, or motor control, and psychosocial mechanisms like reducing fear avoidance behaviours and improving pain efficacy or coping strategies.

A recent network meta-analysis showed that the most effective treatment for reducing pain intensity and functional limitations for LBP were Pilates, McKenzie therapy and functional restoration exercises (10). However, a scarcity data exists in relation to the effectiveness of swimming as an exercise intervention for LBP. A systematic review on the common forms of exercise (walking/running, cycling, and swimming) for LBP uncovered a small, single trial, where swimming was more effective than minimal or no intervention for LBP in the short and medium term (11). Further, one scoping review on the topic of swimming and LBP revealed an unclear pattern of association between the two, as it included specific populations not likely to generalise to people who experience LBP (12), while the other scoping review concluded that swimming for LBP was a low-risk form of exercise, but only limited research supported it as a recommendation for people with LBP (13). To date, no evidence currently exists regarding learning to swim for the management of persistent LBP. This is significant, as swimming involves skill acquisition, i.e., propelling the body through the water, controlled breathing, and ability to remain buoyant (or flat in the water) while in the supine or prone positions (14). As such, uncertainly exists in unskilled swimmers with LBP, such as which strokes should be prescribed, and which should be avoided (15). As such, swimming stroke and technique should be considered when recommending swimming for LBP (13).

Swimming is popular due to its effect on health and wellbeing like cardiorespiratory and musculoskeletal strength and fitness, as well as better mood, sleep and social benefits, like making new friends (16). Moreover, the buoyancy impact whilst swimming reduces stress on joints (17), and as a low-impact activity, is a viable, low-risk for of exercise when injury and health concerns i.e., being overweight/obese hinders other exercise participation (18). In Australia, swimming is a tremendously popular activity, and is largely linked to its national identity (19). Yet, 1 in 4 Australian adults identify as weak swimmers or can’t swim at all. This may be linked to limited knowledge about swimming and its benefits, access to facilities, and cost as well as the fear of exacerbating LBP (20).

In a safe and supportive environment, learn to swim programs, led by qualified teachers and/or coaches, guide participants in a personalised and graded manner. That is, from learning essential water safety (i.e., survival skills) to achieving certain swimming distances (21). Evidence shows 45% of adult participants could swim at least 25 meters, while 10% could swim 50 meters or more following the completion of an 8-week learn to swim program (22). Within a supervised, supportive group setting, learning to swim may facilitate autonomy and self-efficacy development. Empowerment can come from watching fellow participants succeeding in a safe setting, helping develop their own motivation and self-belief, that are elements that enhance task (or skill) mastery (23). The supervised, group setting has the ingredients to help build the confidence to relax and move despite experiencing fear, pain and discomfort (24).

Considering the potential benefits of a learn to swim program, we propose a study that aims to examine the feasibility of a prospective, single-arm trial that teaches people with persistent LBP about pain psychology and progressive swimming skills.

**Our primary research aim** is to explore the feasibility of imbedding pain education within a learn to swim program for people with persistent low back pain. The feasibility of this trial will be investigated with regard to (i) participant recruitment rate, (ii) participant retention in the program, (iii) the collection of patient related outcomes, and (iv) participant perspectives, including satisfaction. This study will inform the feasibility of conducting a definitive randomised controlled trial. Secondary aims within our study will capture outcomes related to pain, disability, as well as quality of life, self-efficacy, physical activity engagement and fear avoidance beliefs associated with persistent low back pain.

**Hypothesis:**

This feasibility and small single-arm trial will show participant recruitment, retention and baseline data completion along with follow up rates to be within pre-determined levels. Further, participants will show trends towards greater self-efficacy, and reduced pain and disability - associated with participation in an education and learn to swim program.

**Ethics**

To be submitted. This study is currently been registered by ANZCTR (Appendix) with a data management plan (Appendix).

**Methods**

*Design:* feasibility of a prospective, single-arm trial.

*Eligible / Ineligible Participants*

*Inclusion* *criteria:*

1. Adults aged 18 years +
2. Persistent LBP >12 weeks
3. Pain intensity >2/10 (numerical pain rating scale – NPRS)
4. Desire to learn to swim
5. Pass the Exercise & Sport Science Australia Adult Pre-Exercise Screening Tool (Appendix)

*Exclusion criteria:*

1. Inability to comprehend written English
2. Recent lumbar spine surgery
3. Signs and symptoms indicative of serious pathology causing LBP (bowel or bladder dysfunction, change in sensation in the perineal region, worsening pain at night, recent fevers/illness, or recent worsening of neurological symptoms in the lower legs, i.e., pins and needles, numbness, sensory loss, muscle weakness).

*Sample size and participant recruitment*

A sample size of 15 participants will be recruited from metropolitan Brisbane and the broader Southeast Queensland (i.e., Sunshine Coast) through healthcare clinic flyers or posters (Appendix), aquatic centre noticeboard/newsletters, social media posts and advertisements (Appendix). Further, university staff and student email news bulletins as well as the CQU health clinic in Indooroopilly (Appendix). Interested participants were emailed an invitation to participate (Appendix) and a consent form (Appendix). Should participants wish to withdraw from the study, they will be required to complete a withdrawal form (Appendix). Interested participants will contact the research team and be subject to a brief screen over the phone for eligibility (Appendix). Participating chiropractors received the learn to swim lessons at no cost.

*Intervention*

In conjunction with a brief LBP education program, participants will learn to swim over a 2-month period, with a qualified swimming teacher.

*1. Progressive group learn to swim program*

A qualified swimming teacher/coach led learn to swim program will be offered to eligible participants. Participants will be encouraged to set goals and progress to 25 meters freestyle (or further progression to 50 meters or lap swimming, if feasible) by the end of the program. A diary or logbook will be provided to help progress the program, discuss barriers and motivate compliance.

*2. Education:*

Pain education programs targeting behavioural characteristics like fear avoidance and pain catastrophizing, which are associated with pain and disability (9). Pain education can be delivered using various approaches, i.e., single or multiple sessions, one-on-one or group interactions, written materials, face-to-face discussions with opportunities for interaction, or online videos (25, 26). Pain education helps participants improve their knowledge and understand persistent LBP in a non-threatening way, including basic pain psychology, coping strategies, and positive expectations. Education is known to promote positive behavioural change and self‐efficacy, facilitating participants to shift their beliefs and re-engage with activity (27). As part of the learnt to swim package, and to ensure all participants receive a consistent pain neuroscience educational experience, we will utilise two 5-minute videos that align with evidence-based practices, and focus on providing a brief, foundational understanding of pain neuroscience. The first video: ‘Tame the Beast: It’s Time to Rethink Persistent Pain’ (<https://www.youtube.com/watch?v=ikUzvSph7Z4>) covers concepts such as ‘pain is a brain output’ and ‘pain is a protective mechanism’, while the second video: ‘Understanding Pain’ comprises concepts related to pain and brain function, the adaptability of the nervous system (neuroplasticity), distinctions between acute and chronic pain, the role of sensitization in heightened pain responses, and the impact of psychological and social factors on pain perception

(https://www.youtube.com/watch?v=C\_3phB93rvI). These videos are freely available for the public and knowingly focus on simplified explanations and engaging formats like animations, thus making made complex topics accessible and engaging (25). Pain education conveys that it is possible to move and engage in activities, even when experiencing some pain, by fostering an appreciation for the benefits of movement despite discomfort (26). This can lead to improved clinical outcomes, including pain and disability in the short-term, and is enhanced with an exercise or physiotherapy-like intervention (28).

*Data collection / outcomes:*

Apart from demographic data (Appendix), the following domains will assess elements associated with feasibility success:

1. Recruitment of participants (to undergo the education and learn to swim program) within a 3-month period.
* Aim: 15 participants.
1. Retain those participants in the 2-month education and learn to swim program.
* Aim: a minimum of 75% follow-up (indirectly suggestive of acceptability).
1. Collection of patient related baseline and follow up outcomes.
* Aim: no more than 20% missing data for the patient outcome measures.
1. Capture the experience of the education and learn to swim program, including perceived benefits, and challenges encountered will be explored through qualitative interviews.
* Aim: gather opinions barriers and facilitators regarding the program from 6-10 participants, including the relevance for participants, to be investigated during an interview.
* In light of the limited data in this field, **qualitative descriptive methods** (29) will capture detailed, rich, straightforward descriptions of participants' experiences, perceptions, and responses to the program. These methods are beneficial when aiming to understand experiences without a theoretical framework, fitting well with an exploratory study. The COM-B model, however, **will be used as a guiding framework to facilitate interview questions and data analysis. As such,** questions will be developed around *Capability*, *Opportunity*, and *Motivation* to inform participant key behavioural components (30), without strictly imposing theoretical constraints. We will conduct an inductive (conventional) qualitative content analysis of the transcripts to identify patterns and generate themes (i.e., categories summarizing participants’ responses). Content analysis is recommended for use in qualitative descriptive studies (Appendix).

At baseline and 3 months, we will also collect exploratory outcomes related to:

1. Disability: Oswestry Disability Index (Appendix).
2. Pain intensity: Numeric Pain Rating Scale(Appendix).
3. Pain self-efficacy: Pain self-efficacy questionnaire (Appendix).
4. Fear Avoidance: Fear-Avoidance Behaviour Questionnaire (Appendix).
5. Physical Activity: The Physical Activity and Sedentary Behaviour Questionnaire (PASB-Q) (Appendix).
6. Patient specific functional scale (Appendix).

**Analysis**

As an exploratory study, we are investigating the feasibility and possible impact of the intervention. Quantitative data (recruitment, retention and follow up rates) will be presented descriptively. As this is a feasibility study, no inferential analyses will be performed. A summary of patient outcomes in terms of pain, disability, self-efficacy, fear avoidance behaviour, and physical activity engagement will be described as median change scores from baseline to 3 months.

The data gathered from the interviews (via Zoom) will be qualitatively analysed.

**Outputs**

This project will result in 1 peer-reviewed publication relevant to the LBP / exercise field. A specific output of this research is to present study findings at relevant musculoskeletal conference meetings. We will also disseminate findings to relevant consumer groups, private health funders, and health professional associations.

**Outcomes**

Our overarching aim is to obtain NHMRC or MRFF funding for a fully powered randomised controlled trial testing education and learning to swim versus usual care. In this current proposal, our aim is to first determine the feasibility of conducting a future randomised controlled trial.The proposed study will gain insights into participant recruitment, feasibility of intervention delivery, data collection as well as participant acceptance, satisfaction and retention. We will examine participants understanding, views and experiences about the education and learn to swim program. We will report trends associated with disability, pain intensity, pain self-efficacy, physical activity engagement and fear avoidance beliefs in people with persistent LBP.

Broadly, no study to date has rigorously evaluated the effectiveness of an education and learn to swim program via a randomised controlled trial. Should such a program demonstrate improved patient outcomes and cost effectiveness, it can be implemented and up-scaled, potentially leading to substantial reductions in the massive burden associated with LBP. Further, it will help translate underused evidence-based treatment recommendations and guidelines by providing effective high-value care. Presently, persistent LBP sufferers who experience ongoing pain and disability are prone to seeking costly additional care in the form of medication, injections, imaging and/or spinal surgery. In an ideal healthcare setting, all LBP sufferers would receive the right care, tailored to their preferences – thus receiving what is needed, desired, clinically effective, affordable, equitable, and responsible in its use of resources (31).

As stated, the future project includes a full powered randomised trial. If our study is found to be feasible, we will lead an industry application (Private health funds / Queensland Health and Wellness grants) as well as future (larger) NHMRC Clinical Trials and Cohort Studies scheme or MRFF Effective Treatments and Therapies grant.

Future funding will be sought to request salaries for post-docs, research students (i.e., PhD) and research assistants to grow this research project and build research capacity within a collaborative multidisciplinary team approach, both within and outside CQU.

This project will significantly contribute to CQUniversity’s engagement with industry and communities to deliver research with true impact. Our proposal is practical, targeting the delivery of real-world solutions that make a difference. This study also ties in with the School of Health, Medical & Applied Sciences research priority areas like public health promotion. This project will also specifically increase productivity and research capacity (and profile) within the Discipline of Chiropractic and more broadly within the Allied Health and Rehabilitation field, tying in with the musculoskeletal health and rehabilitation research cluster within the MHAS.

**Industry partner**

Presently, we have approached industry and have contacted 2 ‘Learn to Swim’ providers within the Brisbane Metropolitan area (Rackley Swimming and UQ Sports), inquiring re their swimming school’s interest in being part of the study. Responses are confirmed below.

**From:** Element Swimming <info@elementswimming.com.au>
**Sent:** Wednesday, October 18, 2023 12:19 PM
**To:** Matt Fernandez <m.fernandez@cqu.edu.au>
**Subject:** Re: Adult learn to swim research

Hi Matt,

Apologies for the late reply. Yes, we would be happy to be part of the study. Just to let you know we lease school pools and can only use the pool outside of school hours. The pool is fairly full weekdays from 3pm to 8pm however Saturday afternoons & all-day Sundays are free. We have 3 pools in Brisbane – Coorparoo, Holland Park or Indooroopilly.

Let me know if you need any further info.

 Kind regards,

**Emily Owen | Marketing & Operations**p: 1800 979 739

e: info@elementswimming.com.au

w: elementswimming.com.au

**From:** Musgrave Park Aquatic Centre <info@musgraveparkaquaticcentre.com.au>
**Sent:** Tuesday, October 17, 2023 8:11 AM
**To:** Matt Fernandez <m.fernandez@cqu.edu.au>
**Subject:** RE: Research for adult learn to swim program

Hi Matt,

Thanks for your email.

We’d be happy to be a part of your study.

Would you like to meet to discuss further.

Please let me know when you are available.

Warm regards,

Bridgette

|  |  |
| --- | --- |
| A black circle with white text  Description automatically generated | 100 Edmondstone StreetSouth BrisbaneTitle: phone - Description: phone-icon  38441084Title: Email - Description: email-iconinfo@musgraveparkaquaticcentre.com.auTitle: website - Description: website-icon[www.musgraveparkaquaticcentre.com.au](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Fprotect-au.mimecast.com.mcas.ms%2Fs%2FwDKICWLJgAio8ELohxwsPl%3Fdomain%3Dmusgraveparkaquaticcentre.com.au%2F%26McasTsid%3D20893&McasCSRF=912aeb90dfc5255154c799ace593aae90f6449721407f3fe2a689662d27af6f0) |

From Kawana Aquatic Center

Hi Matt,

Apologies for my delayed response, I've had a hard run this last couple of months and have been on and off personal leave. I'm only just getting through my emails now.

In terms of safety for my program's risk assessment, I'd have to run a 1-5 ratio at least for me to facilitate this. Pricing for this would be $11.20 per person per class.

Running off this price x 8 weeks for 2 sessions a week would be $896 in total.

Let me know how you'd like to proceed.

Kind Regards,
Kail Willis | Facility Manager
M 1300 332 583
W [www.cityaquatics.com.au](https://mcas-proxyweb.mcas.ms/certificate-checker?login=false&originalUrl=https%3A%2F%2Furl.au.m.mimecastprotect.com.mcas.ms%2Fs%2FoF1nC71Zvqh8rQ3QUWhMIoSHn7%3Fdomain%3Dcityaquatics.com.au%26McasTsid%3D20893&McasCSRF=912aeb90dfc5255154c799ace593aae90f6449721407f3fe2a689662d27af6f0)
E kawana@cityaquatics.com.au



From Dunlop Park

Dunlop Admin<admin@dunloppark.com.au>

Morning Matt,

If you have a poster in A4 I can display it in the change rooms of the male and females.

Thank you,

The Dunlop Park Front Desk Team



**References**

1. James SL, Abate D, Abate KH, Abay SM, Abbafati C, Abbasi N, et al. Global, regional, and national incidence, prevalence, and years lived with disability for 354 diseases and injuries for 195 countries and territories, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. The Lancet. 2018;392(10159):1789-858.

2. Hartvigsen J, Hancock MJ, Kongsted A, Louw Q, Ferreira ML, Genevay S, et al. What low back pain is and why we need to pay attention. The Lancet. 2018;391(10137):2356-67.

3. Ferreira ML, de Luca K, Haile LM, Steinmetz JD, Culbreth GT, Cross M, et al. Global, regional, and national burden of low back pain, 1990–2020, its attributable risk factors, and projections to 2050: A systematic Analysis of the global burden of disease study 2021. The Lancet Rheumatology. 2023;5(6):e316-e29.

4. Buchbinder R, van Tulder M, Öberg B, Costa LM, Woolf A, Schoene M, et al. Low back pain: a call for action. The Lancet. 2018;391(10137):2384-8.

5. National Institute for Health and Care Excellence. Low back pain and sciatica in over 16s: assessment and management. London: National Institute for Health and Care Excellence h.

6. Kongsted A, Kent P, Axen I, Downie AS, Dunn KM. What have we learned from ten years of trajectory research in low back pain? BMC musculoskeletal disorders. 2016;17(1):1-11.

7. Australian Institute of Health and Welfare. Back problems. Canberra: AIHW; 2020.

8. Lin I, Wiles L, Waller R, Goucke R, Nagree Y, Gibberd M, et al. What does best practice care for musculoskeletal pain look like? Eleven consistent recommendations from high-quality clinical practice guidelines: systematic review. British journal of sports medicine. 2020;54(2):79-86.

9. Louw A, Zimney K, Puentedura EJ, Diener I. The efficacy of pain neuroscience education on musculoskeletal pain: a systematic review of the literature. Physiotherapy theory and practice. 2016;32(5):332-55.

10. Hayden JA, Ellis J, Ogilvie R, Stewart SA, Bagg MK, Stanojevic S, et al. Some types of exercise are more effective than others in people with chronic low back pain: a network meta-analysis. Journal of physiotherapy. 2021;67(4):252-62.

11. Pocovi NC, de Campos TF, Christine Lin C-W, Merom D, Tiedemann A, Hancock MJ. Walking, cycling, and swimming for nonspecific low back pain: a systematic review with meta-analysis. Journal of Orthopaedic & Sports Physical Therapy. 2022;52(2):85-99.

12. Wareham DM, Fuller JT, Douglas TJ, Han CS, Hancock MJ. Swimming for low back pain: A scoping review. Musculoskeletal Science and Practice. 2024:102926.

13. Oakes H, De Vivo M, Mills H, Stephensen D. Recommending swimming to people with low back pain: A scoping review. Journal of Bodywork and Movement Therapies. 2023.

14. Tanaka H. Swimming exercise: impact of aquatic exercise on cardiovascular health. Sports medicine. 2009;39:377-87.

15. Hofling I, Linnenbecker S, Ungerechts B, Nicol K, editors. Analysis of lordosis an d kyphosis in swimming. International Symposium on Biomech Med Swim Congr proc 575–578; 2003.

16. Howells K, Jarman D. Benefits of swimming for young children. Physical education matters. 2016;11(3):20-1.

17. Dundar U, Solak O, Yigit I, Evcik D, Kavuncu V. Clinical effectiveness of aquatic exercise to treat chronic low back pain: a randomized controlled trial. LWW; 2009.

18. Mutubuki E, Beljon Y, Maas E, Huygen F, Ostelo R, Van Tulder M, et al. The longitudinal relationships between pain severity and disability versus health-related quality of life and costs among chronic low back pain patients. Quality of Life Research. 2020;29:275-87.

19. Phillips MG. Swimming Australia: one hundred years. 2008.

20. Oakes H, De Vivo M, Stephensen D, Mills H. Survey of the Barriers, Enablers, and Preferences to Swimming for People With Chronic Low Back Pain. The Journal of Aquatic Physical Therapy. 2024;32(2):16-24.

21. <https://www.ais.gov.au/visit/aquatic/swim-school>. [

22. Pidgeon S, P. L. (2022) Analysis of Adult Swim Skills. Royal Life Saving Society – Australia: Sydney.

23. Bandura A. Self-efficacy: toward a unifying theory of behavioral change. Psychological review. 1977;84(2):191.

24. Costello L, McDermott M-L, Patel P, Dare J. ‘A lot better than medicine’-Self-organised ocean swimming groups as facilitators for healthy ageing. Health & Place. 2019;60:102212.

25. Heathcote LC, Pate JW, Park AL, Leake HB, Moseley GL, Kronman CA, et al. Pain neuroscience education on YouTube. PeerJ. 2019;7:e6603.

26. Shala R, Roussel N, Lorimer Moseley G, Osinski T, Puentedura EJ. Can we just talk our patients out of pain? Should pain neuroscience education be our only tool? : Taylor & Francis; 2021. p. 1-3.

27. Moseley GL, Nicholas MK, Hodges PW. A randomized controlled trial of intensive neurophysiology education in chronic low back pain. The Clinical journal of pain. 2004;20(5):324-30.

28. Wood L, Hendrick PA. A systematic review and meta‐analysis of pain neuroscience education for chronic low back pain: Short‐and long‐term outcomes of pain and disability. European Journal of Pain. 2019;23(2):234-49.

29. Neergaard MA, Olesen F, Andersen RS, Sondergaard J. Qualitative description–the poor cousin of health research? BMC medical research methodology. 2009;9(1):1-5.

30. Michie S, Van Stralen MM, West R. The behaviour change wheel: a new method for characterising and designing behaviour change interventions. Implementation science. 2011;6:1-12.

31. Elshaug AG, Rosenthal MB, Lavis JN, Brownlee S, Schmidt H, Nagpal S, et al. Levers for addressing medical underuse and overuse: achieving high-value health care. The Lancet. 2017;390(10090):191-202.