



RESEARCH

INFORMATION

## Aqua Steps - Aquatic exercise therapy for falls prevention in older adults – A feasibility study

### BACKGROUND & AIMS

**Background:** One in three people  $\geq 65$  years fall at least once/year. Falls cause 90% of hip fractures, half of deaths due to injury and have high economic costs. Aquatic exercise has advantages, e.g., buoyancy allows exercising without lifting your own weight, there is more range of motion and less pain in the water. Thus, it could have a positive effect on fall risk factors, such as strength, balance and fear of falling. However, high-quality research on aquatic exercise for falls prevention is scarce.

The **aims** of this research project were to:

- Design and deliver a high-quality aquatic exercise intervention for falls prevention.
- Investigate intervention feasibility and acceptability to older adults at a high risk for falls.
- Have a preliminary look at the programme's effectiveness in reducing falls risk.

### KEY FINDINGS

- We created a new aquatic intervention for older adults at high risk of falls, '**Aqua Steps**', which had very high acceptability, was safe, popular and enjoyable.
- There was strong evidence that Aqua Steps reduces falls, fallers and frequent fallers (38%, 36% and 56% reduction, when comparing 6-month periods pre- and post-intervention).
- There was also strong evidence of substantial improvements in key risk factors for falls: upper and lower limb strength, balance, ability to perform functional movements, fear of falls.
- Improvements were sustained or increased further at follow-up, 6 months post-intervention.
- Aqua Steps had more improvements and of a greater magnitude, than a land exercise group attending an established falls prevention programme that had been running for several years.





## WHAT DID THE STUDY INVOLVE?

**Overview:** This was a 16-week feasibility study with a six-month follow-up. For the experimental group, which followed the newly-designed Aqua Steps programme, 51 older adults of both genders, at high risk of falls, were recruited through self-referrals. Sessions took place in 5 swimming pools, to increase geographical distribution and diversity of people's backgrounds. The study included a land exercise group of people referred by a health professional to an established Falls Management Exercise (FaME) programme (Steady Steps, 50 participants; same eligibility criteria). Both groups had 60 minutes/week of supervised exercise, a 30-minute education/social session and optional home exercises. Aqua Steps instructors followed a standardised manual for programme delivery. Intervention fidelity was ensured through regular observations and feedback. Sessions across venues started between March-June and ended between June-October 2024.

**Primary outcomes:** These were based on the feasibility of Aqua Steps: how quickly participants were recruited, how many stayed in the programme (retention), how many sessions they attended (adherence), if they found the programme acceptable and if it was safe (accidents and adverse events due to the intervention). With respect to these outcomes, we set some minimum targets to inform decision of progression to a subsequent large-scale definitive trial.

**Secondary outcomes:** We had a preliminary look at outcomes related to falls and risk of falls: number of falls and fallers; functional tests (3m walk and return to start- 'timed up and go test', 30-second chair rises, functional reach); leg and handgrip strength; balance; and questionnaires on fear of falling, balance confidence, health and quality of life. Measurements were taken before the start, at the end and six months after the end of the intervention. The participants recorded adverse events and physical activity outwith the sessions through weekly diaries. Views and experiences of participants were gathered in focus groups.

**Patient and public involvement (PPI):** When we started designing the study, we met with people at high risk of falls attending Steady Steps classes, and asked for their views on a potential aquatic programme. We also formed a study advisory steering group, which included two members of the public, one of which had attended falls prevention classes in the past. The group provided advice to the research team in regular meetings before and throughout the study. We ran an open PPI seminar in January 2024, before the programme commenced, where people provided feedback on study structure and design. Another open PPI seminar was held in June 2025, and we received feedback on the study's findings and follow-up plans.

Image 1: Aqua Steps participants during an exercise session

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## WHAT WERE THE RESULTS AND WHAT DO THEY MEAN?

**Primary outcomes:** Aqua Steps exceeded comfortably all targets set for progression to a large-scale trial. Recruitment was completed within a month, retention was 88%, adherence 90%, participants scored the programme 5 out of 5 for acceptability and provided excellent feedback in focus group discussions. Aqua Steps was also safe; in a total of c. 250 pool sessions, there were no accidents or severe adverse events due to participation in the aquatic intervention.

**Secondary outcomes:** There was very encouraging evidence for substantial improvements in several outcomes. In the six months post intervention, falls, fallers and frequent fallers decreased by 38%, 36%, and 58%, compared to the six months pre-intervention. Compared to the start, there were statistically significant improvements at the end of the programme on: all three functional tests (ranging from 22-70%), all three strength tests (10-80%), fear of falling (11%) and balance confidence (8%). There was also evidence of improvement on single-leg balance ability and on quality of life. All improvements were maintained, or increased further at the 6-month follow up. Finally, many participants increased the time they were spending doing other exercise or physical activity after the end of the programme (often continuing pool-based activity), suggesting positive behavioural change. Participants enjoyed the peer group support and felt significant benefits from the individualised and progressive nature of Aqua Steps.

Steady Steps was safe, it reduced falls, fallers and frequent fallers (by 30%, 32% and 35%), and had significant improvements in the three functional tests (8-30%) and fear of falling (7%). The improvement for one functional test and fear of falling were maintained at the follow-up.

**What do the results add to the field?** For older adults at high risk of falling, shallow-water exercise is safe, popular and highly acceptable. It had very promising effectiveness, and improvements may be even better than those of an established land-based programme. As this was designed as feasibility study, a larger randomised controlled trial is now warranted to confirm effectiveness and inform wider implementation.



## WHAT IMPACT COULD THE FINDINGS HAVE?

**Patients:** The findings indicated strongly that a large-scale definitive randomised controlled trial should be completed to examine the benefits to older people at high risk of falls.

**Policy:** Therapeutic aquatic exercise interventions are popular among older adults and safe to run. This, together with the very encouraging improvements, offer strong evidence to support the funding of future trials in aquatic exercise for people with other problems or conditions. This would be particularly beneficial for people who find exercise on land challenging. With 83% of people in the UK living within 2 miles of a pool, such programmes are scalable and accessible.

**Practice:** Older people are willing to engage with and adhere to exercise in shallow water. Organisations should adopt and offer programmes suitable for this demographic. Some organisations have enquired about adding Aqua Steps to their provision. We will facilitate this through licencing agreements, to ensure high-level training and fidelity, and track impact and usage.



## HOW WILL THE OUTCOMES BE DISSEMINATED?

Outcomes are being disseminated through various activities, such as:

- **Open PPI seminar:** Key study findings presented to participants and public (6/2025).
- **Conferences and talks:** a) Five invited oral presentations (6/2024-4/2026): 6<sup>th</sup> International Conference on Evidence Based Aquatic Therapy; Swim England's Annual Health & Wellbeing Network Event; Community Leisure UK, Seriously Social about Swimming and Aquatics Conference; Lothian Falls Conference; Lydia Osteoporosis Symposium; b) Three other presentations (9/2025-6/2026): 26<sup>th</sup> International Conference on Falls and Postural Stability; Chartered Society of Physiotherapy Annual Conference; 3<sup>rd</sup> World Falls Congress; c) Other presentations will follow in the future.
- **Scientific publications:** We aim to publish two papers in peer-reviewed academic journals.
- **Webpages:** We created a website for the study, to disseminate information and findings: <https://blogs.ed.ac.uk/aquasteps/>
- **Media:** News articles, research briefings, social media activity, short videos (see [example](#)).
- **Lay summaries** in newsletters/websites of health care organisations and leisure trusts.

**Next study:** Based on the excellent feasibility of Aqua Steps, we will seek funding for a larger-scale, randomised controlled trial. This would take place in several sites, will include process and economic evaluations, and will inform policy of falls prevention provision.



## CONCLUSION

Take home messages:

- Aqua Steps is popular, enjoyable and safe.
- Strong preliminary evidence that Aqua Steps reduces falls and fallers, and improves function, strength and balance.
- Findings must now be confirmed in a follow-up large-scale definitive trial.



## RESEARCH TEAM & CONTACT

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### Additional Information

The project was completed on 30/09/2025. It received £280,019 from the CSO.