



## Feature Article

# Physical and functional implications of aquatic exercise for nursing home residents with dementia



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## ABSTRACT

Exercise has reported benefits for those with dementia. In the current study we investigated the feasibility of delivery and the physical and functional benefits of an innovative aquatic exercise program for adults with moderate to severe dementia living in a nursing home aged care facility. Ten adults (88.4 years, inter quartile range 12.3) participated twice weekly for 12 weeks. Anthropometric and grip strength data, and measures of physical function and balance were collected at baseline and post-intervention. Feasibility was assessed by attendance, participation, enjoyment and recruitment. Following exercise, participant's left hand grip strength had improved significantly ( $p = .017$ ). Small to moderate effect sizes were observed for other measures. A number of delivery challenges emerged, but participant enjoyment, benefits and attendance suggest feasibility. Aquatic exercise shows promise as an intervention among those with dementia who live in a nursing home aged care facility. Greater program investigation is warranted.

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## Introduction

Alzheimer's disease and other dementias are significant precursors to disability, loss of independence and mortality among older adults. In the United States, dementia was the sixth leading cause of death in 2013, with diagnosis prevalence expected to triple by 2050 unless a significant breakthrough to prevent, slow or stop the disease is realized.<sup>1</sup> A body of research is emerging showing exercise and physical activity has potency as a preventative to dementia.<sup>2,3</sup> Specifically, among those who walk greater distance per day or have demonstrated higher physical capacity and muscle strength, the risk of the development of dementia is reduced

significantly.<sup>4,5</sup> For those with the disease, evidence is positive that with exercise participation, individuals can improve their physical and functional wellbeing<sup>6</sup> with gains extending even to the very old and institutionalized.<sup>7</sup>

The changes that lead to institutionalization among those with dementia vary, but the loss of physical capacity and the behavioral and psychological management challenges for their carer are significant underlying factors. However, these are symptoms acknowledged as preventable prior to nursing home entry and treatable following entry with exercise participation.<sup>8</sup> Even with the growing body of positive evidence, exercise research for this cohort in end of life care is sparse and prescription guidelines are forthcoming. Complicating things further are a number of issues related to the demented participant's anxiety, depression and behaviors,<sup>8</sup> their motivation to participate and safety during participation, as well as facility resources and the availability for effective and beneficial exercise program delivery.<sup>6,7,9</sup> To this end, the identification of program modes and setting that have participant appeal and benefit, and that warrant facility investment is a primary consideration.

Anecdotal evidence suggests that for those with dementia, water based exercise has significant behavioral and psychological benefit, with reports suggesting reduced wandering and improved social interactions and sleeping patterns.<sup>10,11</sup> For adults without

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dementia, there is good evidence that with water based exercise individuals can reduced the symptoms of lower limb osteoarthritis,<sup>12</sup> as well as benefits extending to those with cardiovascular disease and to improved strength and balance.<sup>13–15</sup> For many older adults swimming activity holds significant familiarity, which for those with dementia may be an important key to the positive behavioral outcomes that follow, as well as playing an important role in the motivation to participate.<sup>16,17</sup> However, the question still remains what, if any, physical benefits are available through water based exercise for individuals with dementia, and importantly is this mode of exercise feasible for delivery to nursing home residents. Here we present the results of a small investigation that assessed the feasibility of a dementia-specific aquatic exercise program for nursing home residents with a particular focus on the physical and functional benefits.

## Methods

### Design and sample

A purposeful non-randomized sample of nursing home residents was recruited from two facilities in Queensland, Australia. Potential participants were identified by the facility Service Manager and assessed against the study's inclusion criteria. These were: >65 years of age; residing in a nursing home; with a diagnosed dementia and a past history of swimming. Residents were excluded if they were: wheelchair bound; had unpredictable or dangerous behaviors; or exercise contraindications; or were unable to stand or walk without assistance of another for a minimum of 6 m. Prior to the baseline assessment, informed consent was supplied by the participant's substitute decision maker and individuals deemed physically capable of participation by their medical practitioner. Of the 45 facility residents with dementia, 25 (men = 2, women = 23)

were found eligible for recruitment, and 24 were consented into the study. Ethical approval was obtained from the University of Queensland Medical Research Ethics Committee, and the research discussed in detail prior to recruitment with the facilities administering organization. Participants had to assent to all aspects of the research process. The project flow is presented in Fig. 1.

### Intervention

The Watermemories Swimming Club intervention is a dementia specific, aquatic exercise program designed by an accredited exercise physiologist in consultation with dementia experts. The program incorporates a short walking warm-up and flexibility cool-down, between which participants undertake targeted exercises to improve aerobic, balance, and strength capacity. Specifically, for aerobic exercise participants did high knee marching and butt kicks, for balance a combination of dynamic (tightrope walking backwards and forwards) and static (front and side foot tapping) exercises, and for strength squats, chest and back fly's and calf raises using the water as a resistance. Initially, the program was delivered at a reduced intensity to allow a conditioning phase, but progressed to a moderated intensity after a couple of weeks and as participants demonstrated increased competency. Participants were guided from the pool side by a trained and qualified swimming instructor educated in the program, and assisted in the pool by program volunteers (facility staff or carer). In addition to in-pool volunteer assistance where needed, participants used the pool lane rope, pool side and pool floatation devices to maintain their balance. While encouraged to follow the guidance of the instructor, due to the nature of the cohort sets completed and repetition undertaken were not policed or recorded. Participants were encouraged to do the best they could manage, but monitored for fatigue and told to rest if and when needed.

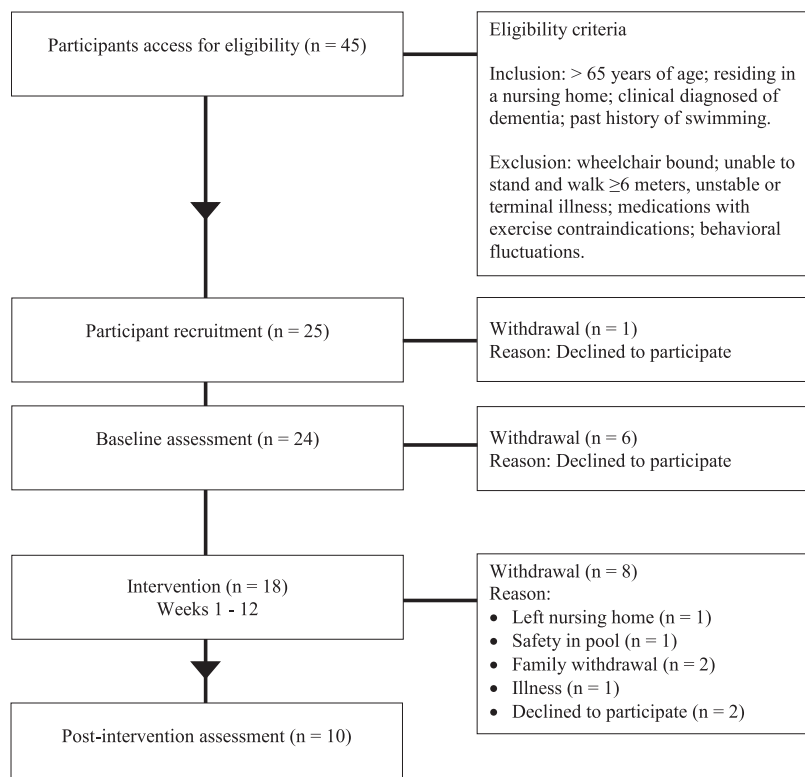


Fig. 1. The Watermemories Swimming Club project flow.

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