Aquatic-based exercise effective as land-based exercise in creating a cardio-respiratory effect in normal individuals

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CRD summary
This paper reviewed the published literature comparing the cardiorespiratory effects of aquatic-based versus land-based exercise in normal individuals. The authors' conclusion appeared to be that the available evidence, although limited, supported the use of aquatic-based exercise programmes to improve cardiovascular fitness in healthy people. The review methodology was inadequate and poorly reported; therefore the conclusions should be treated with caution.

Authors' objectives
To review the published literature for clinical research comparing the cardiorespiratory effects of aquatic-based versus land-based exercise in normal individuals.

Searching
The following databases were searched: CINAHL, the Cochrane Library, Health and Wellness Resource Centre, Medline and PEDro. Search terms reported. The bibliography of the Aquatic section of the American Physical Therapy Association (APTA) was hand searched.

Study selection
This review considered papers to be eligible where the population consisted of healthy adults who were undergoing aquatic-based exercise. Studies comparing aquatic and land-based exercise were also included. Eligible study designs were stated as randomised controlled trials (RCTs), cross-sectional and cohort studies, but the included papers also contained case-series. Expert opinion articles were excluded, as were any articles not published in peer-reviewed or scientific journals. Only papers published within the last 30 years were considered for this review.

Outcomes of interest were not pre-specified. Included papers reported on peak oxygen uptake (VO2, a measure of aerobic capacity), muscle strength, heart rate and other physiological measurements.

The authors did not state how the papers were selected for this review, or how many reviewers performed the selection.

Assessment of study quality
The authors did not state that they assessed validity.

Data extraction
The authors did not state how the data were extracted for this review, or how many reviewers performed the data extraction.

Methods of synthesis
The authors carried out a narrative synthesis.

Results of the review
A total of nine studies (n=178 participants) were included in this review; two RCTs (n=45) and seven case series (total n=133).

Effects of aquatic-exercise on cardiovascular fitness: Three studies (n=68 participants) including one RCT and two case-series assessed this outcome. The RCT reported significant improvements in various physiological measures of cardiorespiratory fitness when comparing aquatic exercise with no exercise. The two uncontrolled case-series’ also found beneficial improvements.

Land versus aquatic therapy for cardiovascular fitness: One RCT (n=15 participants) and five case series studies (n=95
participants) reported on this outcome. The RCT found similar improvements in cardio-vascular fitness for participants exercising on land, in cold water and in warm water. All case-series studies reported water exercise as equal to, or better than, land exercise for eliciting cardiovascular responses.

The review also presents an overview of the effects of water temperature, water depth, speed of movement, and upper versus lower extremity exercises.

**Authors' conclusions**
The authors' conclusion appeared to be that the available evidence, although limited, supported the use of aquatic-based exercise programmes to improve cardiovascular fitness in healthy people.

**CRD commentary**
This article presented a poorly-reported review which appears to have a number of methodological shortcomings. An unfocused review question combined with inadequate inclusion criteria and lack of details on the selection process means this review may have been vulnerable to a number of important biases. The searches covered relevant databases, but language restrictions were not mentioned, and the exclusion of any papers not published in peer-reviewed journals may have resulted in publication bias affecting the results. The validity of the primary studies was not assessed, although study design was taken into account during the synthesis. The poor reporting of included study details means it is difficult to assess to what extent the results of this review follow from the evidence. The review methodology was inadequate and poorly reported, therefore the conclusions should be treated with caution.

**Implications of the review for practice and research**

**Practice:** The authors did not state any implications for practice.

**Research:** The authors stated that further research should compare land versus aquatic-based exercise and explore the impact of variables such as temperature of water, depth of water, speed of movement, activity performed, and upper versus lower extremity exercises.

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on
the reliability of the review and the conclusions drawn.