

## RESEARCH REVIEW

### **Twelve Weeks of Aqua-Aerobic Exercise Improve Health-Related Physical Fitness and Glycemic Control in Elderly Patients with Type 2 Diabetes**

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Review by Kimberly Huff, MS, CSCS

Type 2 diabetes mellitus (T2DM) is one of the fastest growing public health problems. The researchers reported that typically people with T2DM are the elderly and show a decline in muscle mass and an increase of body fat. Previous research has shown that aquatic exercise decreases some of the physiological age related changes and the risk of T2DM by improving circulation, muscle strength and endurance. However more research is needed in regards to the effects of a regular aquatic exercise program on health related physical fitness and glycemic control (blood sugar control) in elderly people with T2DM. The purpose of this study was to investigate the effects of a 12-week aquatic aerobic program on physical fitness and glycemic responses in elderly people with T2DM.

#### **PROCEDURES**

Forty people over the age of 60 with T2DM participated in the study. The subjects were randomly assigned to a 12-week aquatic aerobic exercise group (AE) or a non-exercise control group (NC). The aquatic exercise group participated in a 50-minute aerobic exercise class, 3 days a week for 12 weeks. The AE group used heart rate monitors to maintain an intensity of 70% of maximum heart rate during the class. They were also asked to maintain an RPE (rate of perceived exertion) of 10-16 while exercising.

Body weight, height, percentage of body fat, resting heart rate (RHR) and blood pressure, grip strength, leg strength, flexibility, and maximal oxygen uptake (VO<sub>2</sub> max) were measured on both groups prior to the beginning of the study and at the end of the study. Fasting blood samples were also taken before and after the 12 weeks of the study to measure glycosylated hemoglobin [HbA<sub>1c</sub>] (blood sugar levels), cholesterol, triglycerides and insulin levels.

#### **RESULTS**

- The AE group showed a significant decrease in body weight, body fat, resting HR, and blood pressure (systolic and diastolic blood pressure) after participating in the 12-week aquatic exercise program.
- Muscular strength and VO<sub>2</sub> max significantly increased in the AE group compared to the control group. There were no significant differences in flexibility for both groups.

- The AE group showed significant decreases in glycosylated hemoglobin [HbA1c] (blood sugar), cholesterol, triglyceride, and insulin after participating in the 12-week aquatic exercise program.

## **DISCUSSION**

The researchers reported that the important findings are that participation in a 12-week AE program improved health related physical fitness and glycemic control (blood sugar control) in people over the age of 60 with T2DM by reducing weight, percentage of body fat and blood pressure while increasing VO<sub>2</sub> max and muscular strength. The study also showed improvements in cholesterol, triglyceride and insulin levels after participation in a 12-week AE program. The researchers concluded that the AE training protocol used in this study represents an appropriate exercise method to control glycemic (blood sugar) in older subjects with T2DM. The positive changes in body weight, percentage of body fat, blood sugar levels, cholesterol levels, triglyceride levels and insulin levels are also important in that they could possibly decrease other risk factors for vascular diseases that may be present in people with T2DM such as obesity, high cholesterol and hypertension.

The researchers noted that the improvements in resting heart rate and blood pressure (systolic and diastolic blood pressures) and VO<sub>2</sub> max found in the AE group are consistent with previous studies on the benefits of aquatic aerobic programs for people with T2DM. The researchers suggested that the hydrostatic pressure might have helped to increase the venous return, thus improving blood circulation.

Improvements in circulation and cardiovascular function are also important in decreasing the risk of cardiovascular disease, which often accompanies T2DM.

## **APPLICATION OF RESULTS**

Regular aquatic exercise performed at 70% of MHR will result in improvements in health related physical fitness and glycemic control (blood sugar control) in people with T2DM over the age of 60. Therefore, aquatic aerobic exercise is a recommended mode of exercise for elderly people with T2DM provided the program is individually adjusted to the limitations of each person.

## **AUTHOR**

*Kimberly Huff, MS, CSCS, has a BS in Physical Education and an MS in Health Education. She has been in the fitness industry for over 25 years and is certified by NSCA, ACSM, ACE and AEA. Kimberly was awarded AEA's 2015 Contribution to the Industry, was an associate editor for the AEA Arthritis Foundation Program Leader: A Training Guide for Exercise and Programming, and is an AEA Training Specialist.*

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