High-intensity aquatic exercises (HydroOS) improve physical function and reduce falls among postmenopausal women

Review By Kimberly Huff, MS

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Research has shown that postmenopausal women experience a loss in muscular strength that limits their performance of strength-related activities of daily living. They also experience a decrease in bone mass which increases their risk of fall-related fractures. The decrease in muscular strength and bone mass can be addressed with a properly designed exercise program.

Exercise programs that include balance training, strength training, posture correction, and improved lower limb mobility have been proven to enhance physical function and decrease the risk of falls. Research on aquatic exercise has suggested that the water is a safe and effective environment for improving strength, balance, and functional mobility in women that may be at risk of falls, or those who experience other limitations with land based exercise programs.

The HydroOS aquatic exercise program has been proven to increase bone mass in postmenopausal women. The purpose of this study was to investigate the effects of the HydroOS aquatic exercise program on neuromuscular function and falls among postmenopausal women.

Methods

108 sedentary women with an average age of 58 were randomly divided into an aquatic exercise group (AEG) or a control group (CG). Both groups received daily calcium and vitamin D supplements. Both groups also participated in baseline measurements of the following variables: flexibility (Sit and Reach), static balance (Unipedal Stance Test), mobility (Timed Up and Go), handgrip strength, and isometric strength of the back extensors (SBE), strength of hip flexors (SHF), and strength of knee extensors (SKE). The AEG group participated in the HydroOS aquatic exercise program 3 times a week for 24 weeks. The control group did not participate in the exercise intervention.

This study tracked the number of falls as well as the number of participants that had fallen in the 7 months before the study. This was compared to the number of participants that fell in the 7 months after the study.

HydroOS

The HydroOS sessions were 50-60 minutes and began with a 10-minute warm-up followed by strength/power exercises and cardiovascular training, and finished with 10 minutes of balance and stretching exercises. The exercise sessions were divided in periodized cycles based on intensity. The strength/power exercises were performed without additional equipment and included: elbow extension/ flexion, shoulder adduction/abduction, shoulder horizontal adduction/abduction and knee extension and hip extension. Participants were instructed to do each repetition with maximal effort while maintaining full range of motion. The intensity of the cardiovascular portion was determined by percentage of maximum heart rate and the Borg CR10 Scale (0 to 10 perceived exertion scale).

The first cycle gave the participants the opportunity to become familiar with the program. They were instructed on the proper execution of the exercises proper posture and proper breathing. They maintained 55% MHR (maximum heart rate) during the cardiovascular portion of the workout. The second cycle was performed at 60% MHR (RPE 6) with the participants instructed to do two sets of 30 seconds for each exercise. The third cycle was performed at 70% MHR (RPE 7) with three sets of 20 seconds, the fourth cycle was performed at 80% MHR (RPE 8) with four sets of 15 seconds, and the last cycle was performed at 90% MHR (RPE 9) with five sets of 10 seconds.

Results

All of the neuromuscular variables significantly improved as a result of participation in the HydroOS aquatic program. Flexibility improved by 26%, static balance improved by 14%, mobility as measured by the Timed Up and Go test improved by 23%, handgrip strength (which correlates to overall body strength) improved by 13%, isometric strength of the back extensors improved by 26%, hip flexor strength improved by 18%, and knee extensor strength improved by 7%.

The results also showed an increase in Vitamin D in both groups. The CG had a 21% increase in Vitamin D and the AEG had an increase of 23%. The researchers suggested that the increase in Vitamin D in the control group could be responsible for the significant increases in flexibility (12.2%), static balance (4.5%), mobility (10%), and hip flexor strength (5.7%).

The number of falls and the number of people that fell remained unchanged in the CG. In the AEG, the number of people who fell decreased by 44% following the intervention.

Conclusions

The researchers reported that the significant changes in strength noted in this study were consistent with previous studies on high intensity training. Some of the improvements in this study were significantly greater than previous studies. The researchers suggested that this could be due to the periodization of the HydroOS program. The improvements in the Timed Up and Go can be attributed to the increases in balance, flexibility and muscular strength, all of which are important in terms of fall risk reduction with postmenopausal women.

This study also compared the number of people that fell and the number of falls experienced seven months before the intervention to seven months after the intervention. There was a significant reduction in the number of people that fell after the intervention. The researchers attributed this decrease to improvements in static balance, increases in calcium and vitamin D supplementation and improvements in muscular strength.

The researchers concluded that the HydroOS aquatic exercise program is a safe and effective method for improving flexibility, balance, mobility and muscular strength in postmenopausal women. The program also significantly reduces the number of falls and the number of postmenopausal women that experience falls. The researchers recommend the HydroOS aquatic exercise program as a means to improve physical function, prevent falls and improve quality of life in postmenopausal women.

Author

Kimberly Huff, MS, CSCS has a BS in Physical Education and a MS in Exercise Science. She has been in the fitness industry for over 25 years. Kim is the Fitness Coordinator at a Continuing Care Retirement Community in Florida. She is certified by NSCA, ACSM, ACE and AFAA. Her programs are recognized in the New York Times, Health Fitness, and Living Healthy. She is a member of AFAA Certification Committee.