

# Clinical Effectiveness of an Aquatic Exercise Program on Strength, Balance, Quality of Life and Emotional Well-Being in Those with Visual Impairments: A Protocol Study

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## INTRODUCTION

This study looks at if aquatic therapy can improve balance, lower extremity strength, and quality of life and emotional well being in those with visual impairments.

### Aquatic therapy is:

- A form of exercise in warm water to assist in rehabilitation, fitness, and relaxation

### Goals include:

- Muscle relaxation, improving joint motion, and reducing pain

Mass, weight, density, relative density, buoyancy, hydrostatic pressure, surface tension, refraction and reflection are all forces that are at play with aquatic therapy.

## BACKGROUND

- According to the World Health Organization, more than 2.2 billion people worldwide were living with some degree of visual impairment in 2019.
  - Despite advances in medical research and technology that this number is projected to increase.
- Land based physical therapy has been shown to benefit those with visual impairments, with studies showing improved scores on tests of physical function and improved reported quality of life.
- There is minimal research in regards to the effectiveness of aquatic physical therapy in the visually impaired population.
- Aquatic exercise is believed to be an optimal activity for those with visual impairments, as the predictability of an aquatic environment is thought to allow individuals to have control over the rate and timing of activity.

## PURPOSE

- Determine if there are significant differences in persons with visual impairments who participate in an aquatic therapy program in the following areas:
  - Strength of the lower extremities
  - Balance
  - Quality of life
  - Emotional well-being
- Hypothesis
  - There will be a positive improvement in the above criteria

## PARTICIPANTS

The participants for this study will be recruited from Northeast sight services in Exeter Pennsylvania. This study intends to recruit 20 participants with a diagnosis of a visual impairment to participate in the exercise program. Informed consent will be obtained from all of the participants, which will be read to them by a member of the Northeast Sight Services in order to decrease risk of bias.



## INCLUSION AND EXCLUSION CRITERIA

### INCLUSION CRITERIA:

- Diagnosis of a visual impairment
- Ages 30-80
- All genders
- Alert and Oriented x4
  - Prior to each session to participate

### EXCLUSION CRITERIA:

- Current participation in a vigorous exercise program
- Severe cardiovascular or pulmonary disease
- Pregnancy or recent childbirth
- Major neurological impairments
- Open wounds
- Incontinence
- Uncontrolled hypertension
- Seizure disorder
- Fear of water
- Fever (> 101°) or other COVID-19 related symptoms



## EXERCISE PROTOCOL

<u>Warm up: 5 min</u>		<u>Aerobic: 20-25 min</u>	
Walking/jogging	1.5 min	Walking forward and back	3 laps (about 2 min)
Marching	1 min	Side steps	3 min
Jumping jacks	1 min	March in place	3 min
Lower extremity and upper extremity stretches	1.5 min	Cycling leg motion	3 min
		Flutter kicks	3 min
		Breaststroke kicks	3 min
		Treading water	3 min

### Strengthening: 20-25 min

Trunk twists with a ball to partner	20 reps each side
Pelvic curls front	20 reps
Pelvic curls side to side	20 reps
Karate kicks	20 reps each leg
Standing abdominal crunches with trunk rotations	20 reps
Wall push ups	20 reps
Forward straight leg kick	20 reps each leg
Backward straight leg kick	20 reps each leg
Side kicks with straight leg	20 reps each leg
Butt kicks	20 reps each leg
Hip flexed to 90 and straighten knee	20 reps each leg
Hip and knee flexed to 90 and push leg behind	20 reps each leg
Heel and toe raises	20 reps each
Jump squats	15 reps
Wall squats	15 reps

### Cool Down: 5 min

A free swim where the participants can do whatever cool down exercise they want in the pool. In order to ensure that this exercise program is controlled, it will be provided in the same order each exercise session.

## OUTCOME MEASURES

- BERG Balance Scale
- Balance
- 30 Second Sit to Stand
- Lower Extremity Strength
- SF-36 and Qualitative Questions
- Quality of Life
  - Emotional Well-Being



## EXPECTED DATA ANALYSIS

### Paired T-Test

- 30 Second Sit to Stand
- ### Wilcoxon Signed Rank Test
- BERG Balance Scale
  - SF-36

## PHYSICAL THERAPY IMPLICATIONS

- Treating those with visual impairments is more common, and aquatic therapy can be available choice for treatment.
- Although not everyone has access to pools, this study can also be used to demonstrate that social contact as well as exercise in general is good for improving emotional well being and quality of life.
- More research is needed to obtain information about treating those visual impairments aquatic therapy.



## ACKNOWLEDGEMENTS AND REFERENCES

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