“Impact of a Hydrotherapy Structured Program on Balance, Risk of Falls, Fear of Falling and Health Related Quality of Life in Older Adults, during 12 weeks”

16 April 2015

Physiotherapist César Sá
Introduction

Older Adults

Growth of the Elderly Population

World phenomenon\(^1\)

% of the elderly population in Portugal

16% in 2001

19% in 2011 \(^2\)

\(^1\) OMS (2010)

\(^2\) INE (2012)
Introduction

Balance

– With increasing age, the balance decreases, verifying a more marked decline from age 60 \(^1\)

\(^1\) Perracini e Ramos (2002)
Introduction

Falls

- main causes of morbidity in the Older Adults

occur as a result of balance postural loss\(^1\)

40 to 60% of people over age 65 have experienced at least one fall \(^2\)

\(^1\) Perracini e Ramos (2002)

\(^2\) Cristina et al (2003)
Introduction

The fall triggers serious physical, psychological and social consequences, such as greater dependence for the performance of ADL.¹

Need to carry out prevention programs to ensure the elderly greater independence and greater functional capacity.²


² Perracini e Ramos (2002)
Introduction

Changes in Balance + Fear of Falling = Self confidence

Social isolation and increased dependence of others

↓ daily physical activity
↓ involvement of ADLs

Physical Activity

Improvements in Health Related Quality of Life in Older Adults

1 Carter et al (2001)
2 Koltyn (2001)
Introduction

Hydrotherapy

Beneficial effects on health of the elderly population relatively to balance and risk of falls\(^1\)

Importance of this study

Few studies have been conducted to verify these effects in the elderly compared to the balance, risk of falls, fear of falling and health related quality of life as well as fully described intervention programs\(^2\)


\(^2\) Booth, 2004
The study...
Objective of the Study

Evaluate the impact of a Hydrotherapy structured program during 12 weeks, on balance, risk of falls, fear of falling and health related quality of life in older adults over 60 years in the Lavradio and Barreiro Swimming Pools.
A 12-week Hydrotherapy structured program promotes significant improvements:

- in balance, risk of falls, fear of falling and quality of life among older adults, compared to the control group \(^1\)

- in men compared to women in balance, risk of falls, fear of falling and quality of life \(^2\)

\(^1\) Devereux, Robertson e Briffa (2005)

\(^2\) Niino, Kozakai e Eto (2003)
Method

Study Design

– Quasi-experimental pre/post study with a control group

Participants

– N = 187 participants (female = 128; male = 68)
  – Intervention Group = 142 participants (M = 69.73 years; SD = 5.61)
  – Control Group = 45 participants (M = 69.60 years; SD = 6.26)
Method

Instruments

- Demographic questionnaire
- Berg Balance Scale
- Timed Up & Go Test
- Falls Efficacy Scale (FES)
- SF-12v2® Health Survey
- International Physical Activity Questionnaire (IPAQ)
- Body Composition Monitor BF500© - Digital Scale
- Tape measure
Method

Inclusion criteria

– subjects aged over 60 years
– Independent walking
– Independence in ADLs
– absence of medical contraindication to exercise
– 80% participation in the treatment

Exclusion criteria

– urinary or fecal incontinence, renal insufficiency, open wounds, contagious skin diseases, infectious diseases, catheters, vascular thrombi, cardiac insufficiency, uncontrolled arterial pressure, dyspnea upon minimal effort, use of psychotropic drugs (benzodiazepines)
– participation in any other physical activity or physical therapy program

1 Resende, Rassi e Viana (2008)
Method

Intervention

Intervention Group

Hydrotherapy structured program for 12 weeks, 2 times a week, 40 minutes each session

Control Group

without any physical activity
Method

- Warm up phase (5 minutes)
  1 - Walking around the pool at progressive speed but maintaining a comfortable speed on the last of the five laps

- Fundamental phase (30 minutes)
  2 - Walking in a circle with changes in direction
  3 - Walking with changes in direction
  4 - Walking forward with forward hip flexion (kicking)
  5 - Walking with hip and knee flexion and trunk rotation
  6 - Walking with knee flexion and hip extension, with the heel touching the hand behind the back
  7 - Walking with waistline dissociation
  8 - Lateral walking with member abduction and adduction
  9 - Sitting/lifting with weight transfer
  10 - Walking with one foot in front of another
  11 - Unipodal support with weight transfer
  12 - Bilateral shoulder horizontal abduction and adduction
  13 - Trunk rotation pushing water with the upper extremities
  14 - Bilateral shoulder flexion/extension
  15 - Release the ball standing on one foot
  16 - Riding the noodle
  17 - The Snail

- Cool down and stretching phase (5 minutes)
  18 - Walking around the pool at regressive speed. Participants were told to stop at the end of the fifth lap
  19 - Stretching exercises of the quadriceps muscle, ischiotibial, shoulders, triceps, chest and neck (30 seconds each)

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Results

There were no differences in the physical activity level between the 2 groups at baseline.

The average attendance in the program was high (90.04%).
## Results

Table - 2x2 Factorial ANOVA in function of the study groups

<table>
<thead>
<tr>
<th>2x2 Factorial ANOVA</th>
<th>Baseline</th>
<th>Follow-up twelve weeks</th>
<th>F</th>
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<td>M</td>
<td>SD</td>
<td>M</td>
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<td><strong>Berg Balance Scale</strong></td>
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*** p < 0.001  
** p <0.01  
* p <0.05
Results

*** p < 0.001
** p < 0.01

Scales

- Berg Scale
- TUG
- TUG - Risk of Falls
- FES
- SF-12 - Physical Domain
- SF-12 - Mental Domain

Intervention Group
Control Group
# Results

Table – 2x2 Factorial ANOVA in function of gender (only for the intervention group)

<table>
<thead>
<tr>
<th>2x2 Factorial ANOVA</th>
<th>Baseline</th>
<th>Baseline</th>
<th>Follow-up twelve weeks</th>
<th>Follow-up twelve weeks</th>
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*** p < 0.001  
** p < 0.01  
ns - not significant
Results

** p < 0.01

** Scales

- Berg Scale
- TUG
- TUG - Risk of Falls
- FES
- SF-12 - Physical Domain
- SF-12 - Mental Domain

** p < 0.01
Discussion/Conclusion

Hydrotherapy Intervention Group versus Control Group

- **Balance**

- **Risk of falls**
  - Booth, 2004; Douris et al, 2003

- **Fear of falling**
  - Booth, 2004; Douris et al, 2003; Devereux et al, 2005

- **Health related quality of life**
  - Perracini & Ramos, 2002; Gregg et al, 2000
**Hypothesis:** Male participants had an initial higher scores than female in Berg Balance Scale and SF-12 Physical Domain, thus women were more likely to have a greater range of changes than men.
This program should be easy to replicate, since each exercise and its frequency, intensity and duration were described. 

12 week program
2 times per week

There is evidence that this duration and frequency shows significant improvements in endurance, balance and functional performance as well as a decrease in the rate of falls.

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1 Resende, Rassi e Viana (2008)

2 Devereux et al (2005); Vivas et al (2011); Hosseini et al (2011); Alikajeh et al (2012)
Future Studies...

• Comparison of land versus water-based exercise, with a control group and objective measures and adherence.

• Longer-term follow-up is needed to determine the effect on incidence of falls.

• Compare older men and women in an Aquatic Exercise program in order to draw more specific conclusions about the risk of falls related to gender and which characteristics affect it.
Conclusion

This Hydrotherapy program promoted increases in balance and a reduction in the risk of falls among older adults in a community/real setting, as well as lower levels of fear of falling and better levels of HRQOL.

Hydrotherapy appears to be a viable physical therapeutic resource, with translational value, to be recommended for preventing falls among older people.
References


References


Thank You!