Exercise for falls prevention in residential aged care

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Context – falls and their impact on seniors, residents and the community

Specific components of successful exercise programs for falls prevention

How this relates to residential aged care (RAC)

Translating research into practice - “The Sunbeam” program for RAC.

Preliminary feedback and data
- 30% of community dwellers and 60% of residents of aged care fall each year (Cameron et al 2012)

- Falls in this population are often traumatic – the most common injury-related cause of death, account for 90% of fractures (Barker et al 2012)

- Australia’s residential aged care (RAC) population is projected to more than treble by 2050 (Productivity Commission 2012)

- No other single injury, including road trauma, costs the health system more than injuries resulting from falls (Bradley et al 2007)
Previous research:

FALLS PREVENTION

- Falls not purely random events – can be predicted by assessing a number of risk factors

(Gillespie et al 2009, Tiedeman et al 2011, Haran et al 2010)
Previous research

**Falls in the community** (Gillespie et al 2009 – COCHRANE REVIEW)

There is clear evidence that exercise is beneficial for the prevention of falls in the community.

**Falls in residential aged care** (Cameron et al 2012 – COCHRANE REVIEW)

Results relating to the effectiveness of exercise in reducing the rate of falls and risk of falling are inconsistent.

There are currently no RCT to recommend **for or against** the use of customised exercise programs to prevent falls in long term aged care settings” (Clinical Practice Guidelines AGS/BGS 2011)
Exercise in residential aged care

Cameron et al 2010 Review from The Cochrane Collaboration

Updated 2012 with a focus on level of care.

POOLED DATA FROM:

• **2 studies showed significant reduction in fall rates**
  (Shimada 2004 and Sihvonen 2004)

• **2 studies showed no change**
  (Choi et al 2005, Sakamoto et al 2006)

• **4 studies showed significant increase**
### Analysis 1.1. Comparison of Supervised exercises vs usual care (nursing care facilities), Outcome 1 Rate of falls

**Review:** Interventions for preventing falls in older people in nursing care facilities and hospitals

**Comparison:** Supervised exercises vs usual care (nursing care facilities)

**Outcome:** Rate of falls

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Intervention</th>
<th>Usual care</th>
<th>log [Rate ratio]</th>
<th>Rate ratio</th>
<th>Weight</th>
<th>Rate ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>N</td>
<td>(SE)</td>
<td>IV(Random,95% CI)</td>
<td></td>
<td>IV(Random,95% CI)</td>
</tr>
<tr>
<td>Faber 2006</td>
<td>142</td>
<td>90</td>
<td>0.12 (0.09)</td>
<td>22.1 %</td>
<td>1.13 [ 0.95, 1.35 ]</td>
<td></td>
</tr>
<tr>
<td>Mulrow 1994</td>
<td>97</td>
<td>97</td>
<td>0.28 (0.17)</td>
<td>18.5 %</td>
<td>1.32 [ 0.95, 1.85 ]</td>
<td></td>
</tr>
<tr>
<td>Rosendahl 2008</td>
<td>87</td>
<td>96</td>
<td>-0.2 (0.32)</td>
<td>11.7 %</td>
<td>0.82 [ 0.44, 1.53 ]</td>
<td></td>
</tr>
<tr>
<td>Sakamoto 2006</td>
<td>315</td>
<td>212</td>
<td>-0.2 (0.12)</td>
<td>20.9 %</td>
<td>0.82 [ 0.65, 1.04 ]</td>
<td></td>
</tr>
<tr>
<td>Schoenfelder 2000</td>
<td>9</td>
<td>7</td>
<td>1 (0.33)</td>
<td>11.3 %</td>
<td>2.72 [ 1.42, 5.19 ]</td>
<td></td>
</tr>
<tr>
<td>Shimada 2004</td>
<td>15</td>
<td>11</td>
<td>-0.63 (0.47)</td>
<td>7.3 %</td>
<td>0.53 [ 0.21, 1.34 ]</td>
<td></td>
</tr>
<tr>
<td>Shiwonen 2004</td>
<td>20</td>
<td>7</td>
<td>-0.92 (0.43)</td>
<td>8.3 %</td>
<td>0.40 [ 0.17, 0.93 ]</td>
<td></td>
</tr>
</tbody>
</table>

**Total (95% CI)**

Heterogeneity: Tau^2 = 0.10; Chi^2 = 22.82, df = 6 (P = 0.00086); I^2 = 74%

Test for overall effect: Z = 0.03 (P = 0.98)

Cameron et al 2010
### Analysis 1.2. Comparison of Supervised exercises vs usual care (nursing care facilities), Outcome 2 Number of fallers.

**Review:** Interventions for preventing falls in older people in nursing care facilities and hospitals

**Comparison:** Supervised exercises vs usual care (nursing care facilities)

**Outcome:** Number of fallers

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Intervention</th>
<th>Usual care</th>
<th>log [Risk ratio] (SE)</th>
<th>Risk ratio</th>
<th>Weight</th>
<th>Risk ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choi 2005</td>
<td>29</td>
<td>30</td>
<td>-0.51 (0.58)</td>
<td>1.9 %</td>
<td>0.60 [0.19, 1.87]</td>
<td></td>
</tr>
<tr>
<td>Faber 2006</td>
<td>142</td>
<td>90</td>
<td>0.31 (0.19)</td>
<td>17.5 %</td>
<td>1.36 [0.94, 1.98]</td>
<td></td>
</tr>
<tr>
<td>Mulrow 1994</td>
<td>97</td>
<td>97</td>
<td>0.15 (0.17)</td>
<td>21.8 %</td>
<td>1.16 [0.83, 1.62]</td>
<td></td>
</tr>
<tr>
<td>Rosendahl 2008</td>
<td>87</td>
<td>96</td>
<td>0.05 (0.16)</td>
<td>24.6 %</td>
<td>1.05 [0.77, 1.44]</td>
<td></td>
</tr>
<tr>
<td>Sakamoto 2006</td>
<td>315</td>
<td>212</td>
<td>-0.11 (0.16)</td>
<td>24.6 %</td>
<td>0.90 [0.65, 1.23]</td>
<td></td>
</tr>
<tr>
<td>Shimada 2004</td>
<td>15</td>
<td>11</td>
<td>-0.49 (0.46)</td>
<td>3.0 %</td>
<td>0.61 [0.25, 1.51]</td>
<td></td>
</tr>
<tr>
<td>Stenvon 2004</td>
<td>20</td>
<td>7</td>
<td>-0.26 (0.31)</td>
<td>6.6 %</td>
<td>0.77 [0.42, 1.42]</td>
<td></td>
</tr>
</tbody>
</table>

**Total (95% CI)**

Heterogeneity: Chi² = 6.47, df = 6 (P = 0.37); I² = 7%
Test for overall effect: Z = 0.39 (P = 0.70)

Cameron et al 2010
Studies showing a reduction in fall rates

**Shimada et al 2004 (n = 26, 6 months follow-up)**
- Perturbed walking using a bilateral separated treadmill v usual care
- TOTAL = 100 hours

**Sihvonen et al 2006 (n = 27, 1 year follow up)**
- Visual feedback based balance training (computer screen, balance plate causing perturbations) v usual care
- TOTAL = 6 hours

Studies showing no change in fall rates

**Sakamoto et al 2006 (n = 527, 6 month follow up)**
- Uni – pedal standing v usual care
- TOTAL = 18.2 hours

**Choi et al 2005 (n = 68, 12 week follow up)**
- Tai Chi v usual care
- TOTAL = 21 hours
Pooled data from these studies showed an increase in fall rates.

**Faber 2006** (n = 278, 1 year follow up)
- “Functional walking”
- TOTAL = 52 hours

**Mulrow 1994** (n = 194, 4 month follow up)
- ROM ex, leg weights until deemed able to walk well then progressed to walking
- TOTAL = 24 hours

**Schoenfelder (2000)** (n = 16, 6 months follow up)
- Heel raises 5-10 reps as able, 10 mins walking
- TOTAL = 12 hours

**Rosendahl 2008** (n = 191, 6 month follow up)
- Balance, Squats, stepping up/down, walking program
- TOTAL = 21.75 hours
Components of effective exercise programs

(Sherrington et al 2011, Tiedeman et al 2011)

• Total dose of exercise – 50 hours minimum
• High level balance work
• Strength work for those who are deconditioned
• All exercises individually upgraded – progressed
• Close supervision – to allow for safe inclusion of high level balance work
• Maintenance program continued after initial conditioning phase
• Walking program (while beneficial for other health conditions) should not be considered a falls prevention program
Objectives of the current trial.

The key research questions are:

- Is a supervised progressive resistance training and balance group based exercise program more effective than usual care for prevention of falls among residents over a 12-month follow-up period?
- Does the program result in improvements to the secondary outcomes: quality of life, cognition, mobility and confidence?
- Is the program cost effective?
Research Plan

- Multi-centre cluster randomised controlled trial
- 16 RACF, 220 participants in NNSW and SE Queensland
- RACF randomised to “Intervention Group” or “Usual care group”
From the residents and their families.

“My back is no longer painful, it used to be my biggest problem, also my legs feel stronger”

“The exercises have definitely been beneficial; I have much more get up and go now.”

“My mother used to be in and out of hospital every month, because of falls, she hasn’t fallen once in the 6 months since she started this program, we can’t believe it”
From the residents’ perspective
Acknowledgements

- Professor Kathryn Refshauge
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- Dr Tim Henwood

HUR Health and Fitness Equipment