Is exercise effective for treating depressed elderly?

Journal Club
Samir Patel, MD MPH
03/08/2013
- Common
- Associated with negative outcomes
- Inadequately treated
- Problems with medication
- Can physical activity can ameliorate depressive symptoms?

Depression in elderly
...in older adults with depression, structured exercise with mixed elements of endurance and strength training reduced depression severity after three to 12 months of follow-up.

The authors suggest...
1. Is the clinical question clearly focused with regard to:
   - The population?
   - The intervention?
   - The outcome measures?
- What is the effect of exercise on depression severity among older persons with clinically significant symptoms of depression?

- Does treatment effect vary according to depression criteria, clinician-diagnosed depression vs. symptom checklist threshold?
2. Are the criteria for selection of the studies to be included in the review in accordance with:

- The specifications of the foregoing questions in regard to populations, interventions and results?
- The type of research design that will be chosen?
Older people (≥60 y)

A clinically valid method of assessing depression

Exercise interventions
  - Body movement activity
  - Planned/structured
  - Specified frequency/duration/intensity

Any control

Depression as outcome at follow-up (≥3 m)

RCTs

Eligibility Criteria
Is the literature search method clearly specified?

- 2 reviewers extracted data
- Until Jan 2011
- 20 databases used
- Bibliographies of included papers screened
- MeSH terms and text terms related to exercise, depression, age

I—Validity
Flow diagram of study selection.a.

Citations identified  
$n = 3492$

Duplicate citations removed  
$n = 559$

Citations screened  
$n = 2933$

Screened citations excluded  
$n = 2757$

Full-text articles assessed for eligibility  
$n = 176$

Excluded $n = 167^a$
- No depression eligibility $n = 71$
- Not randomised design $n = 51$
- Follow-up < 3 months $n = 35$
- Sample age < 60 years $n = 26$
- Not exercise intervention $n = 12$

Included studies  
$n = 9$

Studies in meta-analysis  
$n = 7$

Bridle C et al. BJP 2012;201:180-185
4. Have the identified studies been evaluated for methodological quality?

- Independent assessment by 2 authors
- Cochrane risk of bias tool
  - low, medium or high
5. Was the methodological quality evaluation carried out by more than one person independently, and the degree of agreement between them established?

Yes  I—Validity

Nor
1. Clinical question focused enough? Yes
2. Are criteria for selection of the studies in accordance to previous question? Yes
3. Is the literature search method clear and exhaustive? Yes
4. Is methodological quality of the included studies evaluated? Yes
5. Is this carried out by more than one persons independently? Yes
   ▪ the degree of agreement between them established? No
- Mean difference in outcome measure was standardized for each trial (SMD)
  - Hedge’s g
- Heterogeneity between trials
  - $I^2$
- Meta-analysis performed using random effects model
- **Stratified** analysis
- Sensitivity analyses
Results
<table>
<thead>
<tr>
<th>Study, author (country), depression eligibility</th>
<th>Participants, n (% female); age, years mean (s.d.); depression, mean (s.d.)</th>
<th>Interventions, exercise type, intensity, frequency and duration, programme length, setting and provider</th>
<th>Outcome, measure (end-point); mean (s.d.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brems⁵⁶ (USA), PHQ-9 (2-4 symptoms)</td>
<td>37 (62); 54.6 (6.6); GDS-15; I = 7.0 (3.0); C = 7.8 (4.2)</td>
<td>I: Moderate/high-intensity aerobic and resistance training at three 60 min weekly group sessions for 4 months. Delivered by ACSM instructor in local sports centre. C: Telephone discussion with researcher about health status at 2, 6, 10 and 14 weeks</td>
<td>GDS-15 (4 months): I = 4.5 (2.9); C = 6.3 (3.5)</td>
</tr>
<tr>
<td>Chiechanowski¹⁷ (USA), DSM-IV minor depression or dysthemia</td>
<td>138 (79); 73.0 (8.5); HSCL-20; I = 1.3 (0.5); C = 1.2 (0.5)</td>
<td>I: Depression management programme of eight 50 min individual sessions over 19 weeks, promoting 30 min moderate intensity activity on 5 days per week. C: Physician informed of positive depression screen and advised usual care</td>
<td>HSCL-20 (12 months): I = 0.82 (0.62); C = 1.01 (0.46)</td>
</tr>
<tr>
<td>Chou²³ (China), CES-D ≥ 16</td>
<td>14 (50); 72.6 (4.2); CES-D; I = 32.0 (9.9); C = 32.7 (8.7)</td>
<td>I: Moderate-intensity Tai Chi at three 45 min weekly group sessions for 3 months. Delivered by Tai Chi practitioner in a psychogeriatric out-patient clinic. C: No intervention, waiting list</td>
<td>CES-D (3 months): I = 15.3 (9.8); C = 39.1 (9.7)</td>
</tr>
<tr>
<td>Kerse²² (New Zealand), 3 question, primary care depression screen</td>
<td>193 (58.5); 81.1 (4.4); GDS-15; I = 3.4 (2.7); C = 4.0 (2.8)</td>
<td>I: Otago programme – moderate-intensity balance, progressive resistance and strengthening exercises and walking, each at three 30 min sessions per week for 6 months. Delivered at home by trained nurse in seven visits over 3 months. C: Equal social contact with nurse using conversational guide</td>
<td>GDS-15 (12 months): I = 2.4 (2.2); C = 2.8 (2.2)</td>
</tr>
<tr>
<td>Mather²⁰ (UK), ICD-10 mood disorder + GDS ≥ 10 + antidepressant</td>
<td>86 (69); 64.9 (range 53-91); HRSD; I = 16.7; C = 17.4</td>
<td>I: Mixed endurance, strength and stretching exercise at two 45 min group sessions per week for 10 weeks. C: Equal contact health education talks, including sessions on depression and exercise</td>
<td>HRSD (34 weeks): I = 11.5 (3.3); C = 13.7 (3.3)</td>
</tr>
<tr>
<td>Sim²¹ (Australia), GDS ≥ 11</td>
<td>38 (66); 74.3 (5.9); GDS-30; I = 12.6 (3.6); C = 12.2 (3.5)</td>
<td>I: Moderate-intensity progressive resistance training at three 30 min weekly sessions for 10 weeks. Tailored and delivered by gym instructor in local gym. C: Exercise advice and information about local exercise options</td>
<td>GDS-30 (6 months): I = 11.5 (6.7); C = 11.9 (4.9)</td>
</tr>
<tr>
<td>Singh¹⁸ (USA), DSM-IV criteria for (unipolar) depression including dysthymia</td>
<td>32 (63); 71.0 (2.0); BDI; I = 21.0 (2.0); C = 18.3 (1.8)</td>
<td>I: High-intensity progressive resistance training at three 45 min weekly group sessions for 10 weeks, supervised at university facility, followed by 10 weeks, unsupervised exercise at home with weekly telephone support. C: Health education lectures and videos at two 1h group sessions per week for 10 weeks</td>
<td>BDI (20 weeks): I = 9.2 (2.8); C = 11.0 (2.4)</td>
</tr>
<tr>
<td>Tsang²⁴ (Hong Kong), current diagnosis or GDS (cut-off NR)</td>
<td>97 (81); 82.3 (NR); GDS-15; I = 5.17 (2.8); C = 6.50 (1.4)</td>
<td>I: Moderate-intensity Qi Gong at three 30-45 min weekly group sessions with 15 min/day unsupervised Qi Gong for 16 weeks. Delivered in care home by Qi Gong practitioner. C: Newspaper reading group with therapist in care home – equal contact All interventions delivered by interventionists/researchers in care home at five 30 min individual weekly sessions for 16 weeks. I: Moderate-intensity mixed exercise – strength, balance, flexibility, walking. C: Social conversation</td>
<td>GDS-15 (24 weeks): I = 3.4 (2.5); C = 5.7 (1.5)</td>
</tr>
<tr>
<td>Williams¹⁹ (USA), CSDD ≥ 7</td>
<td>32 (89); 87.9 (6.0); CSDD; I = 12.18 (5.0); C = 14.6 (5.8)</td>
<td>I: Moderate-intensity mixed exercise – strength, balance, flexibility, walking. C: Social conversation</td>
<td>CSDD (16 weeks): I = 9.7 (6.6); C = 11.8 (8.1)</td>
</tr>
</tbody>
</table>
Were the results consistent from one study to another?

II—Interpretation of the Results
Trial-level data, effect estimates and forest plots for depression severity.

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Exercise</th>
<th>Control</th>
<th>SMD IV, Random, 95% CI</th>
<th>SMD IV, Random, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>s.d.</td>
<td>Total</td>
<td>Mean</td>
</tr>
<tr>
<td>Chou (2004)</td>
<td>15.3</td>
<td>9.8</td>
<td>7</td>
<td>39.1</td>
</tr>
<tr>
<td>Tsang (2006)</td>
<td>3.4</td>
<td>2.5</td>
<td>48</td>
<td>5.7</td>
</tr>
<tr>
<td>Singh (2001)</td>
<td>9.2</td>
<td>2.8</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td>Mather (2002)</td>
<td>11.5</td>
<td>3.3</td>
<td>42</td>
<td>13.7</td>
</tr>
<tr>
<td>Brenes (2007)</td>
<td>4.5</td>
<td>2.9</td>
<td>14</td>
<td>6.3</td>
</tr>
<tr>
<td>Clechanowski (2004)</td>
<td>0.82</td>
<td>0.62</td>
<td>72</td>
<td>1.01</td>
</tr>
<tr>
<td>Williams (2008)</td>
<td>9.7</td>
<td>6.6</td>
<td>16</td>
<td>11.8</td>
</tr>
<tr>
<td>Kerse (2010)</td>
<td>2.4</td>
<td>2.2</td>
<td>94</td>
<td>2.8</td>
</tr>
<tr>
<td>Sims (2006)</td>
<td>11.5</td>
<td>6.7</td>
<td>14</td>
<td>11.9</td>
</tr>
</tbody>
</table>
What were the overall results of the review?

How precise were the results?

II—Interpretation of the Results

<table>
<thead>
<tr>
<th>Effect foci</th>
<th>Trials, n (participants, n)</th>
<th>Effect size, SMD (95% CI)</th>
<th>$I^2$, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed exercise</td>
<td>7 (519)</td>
<td>-0.34 (-0.52 to -0.17)</td>
<td>0</td>
</tr>
<tr>
<td>Diagnostic criteria</td>
<td>3 (195)</td>
<td>-0.38 (-0.67 to -0.10)</td>
<td>0</td>
</tr>
<tr>
<td>Symptom checklist</td>
<td>4 (324)</td>
<td>-0.34 (-0.62 to -0.06)</td>
<td>25</td>
</tr>
<tr>
<td>Lowest risk of bias</td>
<td>3 (404)</td>
<td>-0.36 (-0.61 to -0.10)</td>
<td>27</td>
</tr>
<tr>
<td>Active control</td>
<td>4 (284)</td>
<td>-0.44 (-0.67 to -0.20)</td>
<td>0</td>
</tr>
<tr>
<td>Extended follow-up</td>
<td>4 (436)</td>
<td>-0.32 (-0.54 to -0.10)</td>
<td>19</td>
</tr>
</tbody>
</table>

SMD, standard mean difference.
Strengths and Weakness per Authors
<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weakness</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Pre-specified protocol</td>
<td>☐ ?publication bias</td>
</tr>
<tr>
<td>☐ Comprehensive search</td>
<td>☐ Moderate risk of bias</td>
</tr>
<tr>
<td>☐ Public health implications</td>
<td></td>
</tr>
<tr>
<td>☐ Outpatients</td>
<td></td>
</tr>
<tr>
<td>☐ 68% participated</td>
<td></td>
</tr>
</tbody>
</table>
In older people with clinically meaningful symptoms of depression, **structured exercise with mixed elements of endurance and strength training** reduced depression severity.

The evidence for 3-D training, i.e., Tai Chi and Qi Gong, was insufficient.
Are my patients similar to the patients included in the original studies?

- Many are
- Older
- Comorbidities
- What about medications?

III—Applicability of the Results
- Is the intervention feasible in my setting?
  - I can certainly refer someone
  - Availability
  - Quality
  - $$
  - Transportation

III—Applicability of the Results
• Have all the clinically relevant results been taken into consideration?
  • Harm/Risks?
  • Functional status
  • Socialization

III—Applicability of the Results
Do the benefits outweigh the potential harm?
- Individual decision.
- Longer term follow up
- For prescreened patients, they probably do

III—Applicability of the Results
In depressed elderly, a mix of endurance and strength exercise routine reduced depression severity after 3 to 12 months of follow-up.

Minimized bias

7/9 trial were adequate quality, sensitivity analyses did not change the outcome.

Long-term effects?

Functional impact?

Effectiveness in real world?

MOA?