Effect of Depression on Functional Mobility in Older Adults Following Hip Fracture Surgery: A Systematic Review

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Background

- Falls common, particularly among older adults
- Risk factors for falls:
  - Muscle weakness
  - History of falls
  - Impaired balance
  - Visual impairment
  - Arthritis
  - Impaired activities of daily living (ADLs)
  - Depression
  - Cognitive deficits
  - Age >80 years old
Incidence of Falls\textsuperscript{1,2,3}

- \(~2.8\) billion falls per year
- At least 350,000 older adults hospitalized for hip fracture (fx) per year
  - >95\% caused by fall
  - 50\% never reach prior level of function
  - Up to 33\% mortality rate following a fall
Definitions

- Depression
- Geriatric Depression Scale (GDS)
- Center for Epidemiological Studies-Depression (CES)
- Older Adults
- Functional Mobility
- ADL completion
Geriatric Depression Scale

Choose the best answer for how you have felt over the past week

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Are you basically satisfied with your life?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Have you dropped many of your activities and interests?</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>3. Do you feel that your life is empty?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Do you often get bored?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Are you in good spirits most of the time?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Are you afraid that something bad is going to happen to you?</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>7. Do you feel happy most of the time?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Do you often feel helpless?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Do you prefer to stay at home, rather than going out and doing new things?</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>10. Do you feel you have more problems with memory than most?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Do you think it is wonderful to be alive now?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Do you feel pretty worthless the way you are now?</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>13. Do you feel full of energy?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Do you feel that your situation is hopeless?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Do you think that most people are better off than you are?</td>
<td>√</td>
<td></td>
</tr>
</tbody>
</table>

Total score: 15

- Answers ticked indicate depression, and each score one point
- Although differing sensitivities and specificities have been obtained across studies, for clinical purposes a score >5 points is suggestive of depression and should warrant a follow-up interview
- Scores >10 are almost always depression
Below is a list of the ways you might have felt or behaved. Please check the boxes to tell me how often you have felt this way in the past week or so.

<table>
<thead>
<tr>
<th>Last week</th>
<th>Not at all or less than 1 day</th>
<th>1 to 2 days</th>
<th>3 to 4 days</th>
<th>5 to 7 days</th>
<th>Nearly every day for 2 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>My appetite was poor.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>I could not shake off the &quot;blues.&quot;</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>I had trouble keeping my mind on what I was doing.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>I felt depressed.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>My sleep was restless.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>I felt sad.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>I could not get going.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Nothing made me happy.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>I felt like a bad person.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>I lost interest in my usual activities.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>I slept much more than usual.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>I felt I was moving too slowly.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>I felt fidgety.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>I wished I were dead.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>I wanted to hurt myself.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>I was tired all the time.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>I did not like myself.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>I lost a lot of weight without trying to.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>I had a lot of trouble getting to sleep.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>I could not focus on the important things.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

**SCORING:** zero for answers in the first column, 1 for answers in the second column, 2 for answers in the third column, 3 for answers in the fourth or fifth columns.

A score of 16 or higher is associated with significant depression.
## Psychometric Values of CES and GDS\(^4,5\)

<table>
<thead>
<tr>
<th></th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>Time to administer</th>
<th>Scoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>CES</td>
<td>93%</td>
<td>92%</td>
<td>10-20 Minutes</td>
<td>Indicate prevalence and severity of depression</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>20 items; scored 0-3</td>
</tr>
<tr>
<td>GDS</td>
<td>92%</td>
<td>89%</td>
<td>5-10 Minutes</td>
<td>Indicate prevalence of depression</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>15 items; score range 0-15</td>
</tr>
</tbody>
</table>
Purpose

- The purpose of this systematic review was to determine the effects of depression on functional mobility in older adults following hip fracture surgery
Materials/Methods:

- Databases:
  - PubMed, SAGE, CINAHL, and ProQuest

- Two reviewers independently assessed each study
  - MINORS Scale
Search Terms

(elderly OR older adults) AND (Depression) AND (hip fracture)

NOT (alcohol) NOT (pharmacy) NOT (drugs) NOT (nutrition) NOT (cervical)
Inclusion/Exclusion Criteria

● Inclusion:
  ○ English language
  ○ Human subjects
  ○ Peer reviewed
  ○ Published 2006-2016
  ○ Adults 60+ years old
  ○ Status post hip fx and surgical repair
  ○ Functional outcomes
  ○ Used CES/GDS to measure depression

● Exclusion:
  ○ Irrelevant
  ○ Depression not assessed using GDS or CES scales
  ○ Outcome measures not assessed at least 6 months out
  ○ Adults <60 years old
Articles identified in electronic searching (n=1740)

Articles screened (n=1740)

Duplicates removed (n=2)

Articles where full-text assessed for eligibility (n=20)

Articles included (n=8)

Articles excluded due to irrelevance (n=1718)

Full-text Articles excluded (n=12)
No GDS, CES, or functional outcome scores (n=11)
No outcome measures after 6 months (n=1)
<table>
<thead>
<tr>
<th>Article</th>
<th>MINORS</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Givens et al $^6$</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Fredman et al $^7$</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Williams et al $^3$</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Philips et al $^{10}$</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Piscitelli et al $^{11}$</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Voshaar et al $^9$</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Feng et al $^2$</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>Matheny et al $^8$</td>
<td>22</td>
<td></td>
</tr>
</tbody>
</table>

Noncomparative = \[
\frac{12.5}{16}
\]

Comparative = \[
\frac{19.33}{26}
\]
Results$^{2,3,6-11}$

- 1,740 screened -> 8 cohort studies
- MINORS scores
  - 11-13 in non-comparative studies (mean=12.5)
  - 17-22 in comparative studies (mean=19.33)
- Sample size ranged from 55-804 subjects (N=1774)
- Outcomes: depression, pain, cognition, delirium assessments, ambulation time and distance, balance, and ADLs
Results cont. $^2,^3,^6-^11$

- Depression rate ranged 7.5-69% (average of 40%) of patients

- Depression reported as early as 1 week post-op
  - Lasted through 6 - 12 months follow-up (4 articles)
  - Significant negative impact on:
    - Ambulation time and distance (6 articles)
    - ADL completion (5 articles)
Result cont.\textsuperscript{2,3,6-11}

- Increased pain correlated with depressive symptoms (2 articles)
- Significant decrease in function (1 article)
- Cognitive impairment, comorbidities, and delirium correlated with negative functional outcomes (3 articles)
- Increased fall risk
  - Significantly lower Berg Balance Scores (1 article)
  - Increased Timed Up and Go times (3 articles)
Conclusions

● Moderate evidence suggests depression following hip fx affects functional mobility and increases fall risk
  ○ Impaired cognition (i.e. delirium) and pain negatively impacted outcomes

● Depression identified as early as 1 week post-op
  ○ Found to last a year or greater

● Ambulation and ADL ability declined significantly
Clinical Relevance

- Depressive symptoms are prevalent (~40%)
  - May persist over a year following hip fx surgery
  - Greatly impact return to functional independence

- Depression may correlate with impaired balance
  - Population already demonstrates a high fall risk
Limitations of the Study

- Diverse outcome measures among articles
- Heterogeneity of research methods
- Number of databases searched
- Limited to English articles only
Future Research

- Assessment of depression and functional mobility using standardized outcome measures
- Determine the potential impact of exercise on depression and related functional outcomes
Take Home Message

● Clinicians should consider using the GDS or CES
  ○ Valid, self-report measures that take 5 minutes to complete

● Early identification of depression and referral may be beneficial to decrease depression and maximize functional mobility in older adults

2. Feng L, Scherer SC, Tan BY, Chan G, Fong NP, Ng, TP. Comorbid cognitive impairment and depression is a significant predictor of poor outcomes in hip fracture rehabilitation. *Int Psychogeriatr.* 2010; 22(2): 246-53. doi:http://dx.doi.org/10.1017/S1041610209991487


Thank You..

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