Frailty and In-Home Care

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Disclosures

- No relevant disclosures to report
Objectives

• Gain familiarity the following
  • Definition of frailty
  • Frailty paradigms
  • Assessment of frailty
• Understand differences in prevalence of frailty
• Understand some basic management and treatment
Case 1: Mr. H

- 96 year old Asian male who presented for an evaluation at the Geriatric Clinic.
  - PMH: HTN, osteoarthritis, inguinal hernia and BPH
  - His son arranged the appointment but he didn’t know the reason.
  - 4 weeks ago he fell down outside while doing yard work and was unable to get back up. He waited for his neighbors to return home and they assisted him and called the ambulance.

- Physical Exam:
  - Imbalance on Progressive Romberg
  - Walked 15 feet in 12 seconds
  - Completed 5 chair stands in 9.5 seconds
  - Strength normal in upper/lower extremity.
  - Short Blessed Test 10 (normal <9)
  - MoCA 18/30 (N>26)
Case 2: Mrs. B

- 70 year old African American woman returning for primary care in the readmission prevention clinic
  - PMH: HTN, DM, COPD (oxygen dependent), OSA, and SVT
  - Utilization: 3 ER visits in the last month and one hospitalization in the last year. Was admitted up to 5 times in a year before enrolling in the clinic 4 years ago.
  - PMH: Hypertension, Diabetes, COPD, and Hyperlipidemia
  - SH: Her son recently divorced and moved in with her. Stress related to son’s divorce. Stairs within her apartment. No tobacco and occasional alcohol. 2 falls in the last year. Assistance with IADLs
  - Examination:
    - Pulmonary examination: 6 minute walk, ambulated 450 feet and required 15 L oxygen with exertion.
    - MoCA score 19
    - Upper and lower extremity strength bilaterally 3-4/5
    - Grip Strength 4/5
    - PHQ9 = 8
Definitions of Frailty

- A syndrome associated with multisystem declines in physiologic reserve and increased vulnerability to stressors, resulting in increased adverse outcomes, including disability, hospitalization and death
Definitions of Frailty

• **Paradigms/Viewpoints**

  - Accelerated aging-
    - Accumulation of deficits (Rockwood, 2007)

• **Biological syndrome with distinct pathology** (Fried et al. 2001)

**Assessment of Frailty**

- Limited by definitions and use of the tool
- At least 75 assessment tools
- Most common: Physical Phenotype Model versus broader social/psychological aspects, Frailty index

<table>
<thead>
<tr>
<th>Measurements</th>
<th>Phenotype model</th>
<th>Frailty index</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weight loss: Unintentional weight loss by 10 pounds or 5% of body weight over the past 12 months</td>
<td>Accumulation of clinical deficits of forty items (e.g., loss of hearing, low mood, and tremors). A number of predetermined clinical deficits are assigned, and percentage of presence of these deficits assesses frailty</td>
</tr>
<tr>
<td></td>
<td>Weakness: significant loss of grip strength</td>
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<td>Exhaustion: Self-report of feeling tired most of the time</td>
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<td>Slowness: Long time taken to walk a short distance</td>
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<td>Low activity: unable to walk or needs assistance</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Phenotype model</th>
<th>Frailty index</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-frail: Presence of two measurements</td>
<td>Analysis of frailty along a gradient</td>
</tr>
<tr>
<td></td>
<td>Frail: Presence of three or more measurements</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Phenotype model</th>
<th>Frailty index</th>
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<tbody>
<tr>
<td></td>
<td>Precise definition of frailty clinically reproducible</td>
<td>Extended and flexible items for measurements</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weaknesses</th>
<th>Phenotype model</th>
<th>Frailty index</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Possibility of missing frail individuals</td>
<td>No definite standardization</td>
</tr>
<tr>
<td></td>
<td>Some items depend on self-reporting</td>
<td>Some items depend on self-reporting</td>
</tr>
</tbody>
</table>

Assessment of Frailty

- **Reason for assessment**
  - Risk Assessment
  - Clinical decision making tool
  - Determining prevalence
  - Target for Intervention

- First determining which paradigm for frailty then pick an assessment tool.
  - Accumulation of Deficits
    - Deficit Accumulation Index
  - Biologic Syndrome
    - Physical Frailty Phenotype (Fried Index)
    - FRAIL Scale
Combining Viewpoints

Frailty: Specialty practice

- Frailty assessments research and clinical practice
  - Oncology
    - Comprehensive Geriatric Assessment (CGA) and Physical Frailty Phenotype (PFP)
  - Cardiology
    - PFP and gait speed
  - Surgery
    - PFP, gait speed, Frailty Index, Edmonton Frail Scale
  - Organ Transplant
    - PFP
Frailty in the Community

- 21 cohorts involving 61,500 community-dwelling participants
  - 10.7% frail average
  - 41.6% prefrail average
  - Range from 4.0% to 59.1%
- Prevalence dependent on definitions and assessment
  - Difference between weighted rates of frailty according to physical phenotype (9.9%) versus broad phenotype (13.6%) was statistically significant \((v^2 = 217.7, df = 1, P < .001)\).
Frailty in the Community

- Prevalence dependent on definitions and assessment
  - physical frailty definitions
    - The weighted average prevalence
      - 9.9% for frailty (95% CI = 9.6–10.2%; 15 studies; 44,894 participants)
      - 44.2% for prefrailty (95% CI = 44.2–44.7%; 13 studies; 41,197 participants).
  - Broad Frailty Phenotype
    - The weighted average prevalence
      - 13.6% had frailty (95% CI = 13.2–14.0%; 8 studies; 24,072 participants)
      - 33.5% had a prefrail state (95% CI = 32.9–34.1%; 4 studies; 19,996 participants)
Frailty in the Community

• Prevalence according to sex
  • 11 studies enrolled 17,746 women and 22,596 men studied frailty.
    • In women, the weighted average prevalence of frailty was statistically significantly higher (9.6%, 95% CI = 9.2–10.0%) than in men (5.2%, 95% CI = 4.9–5.5%; $\chi^2 = 298.9$ df = 1, $P < .001$).
  • Prefrailty prevalence was addressed in six studies involving 10,683 female participants and 17,160 male participants.
    • More prevalent in women (39.0%, 95% CI = 38.1–39.9%) than in men (37.3%, 95% CI = 36.6–38.0%; $\chi^2 = 8,629$, df = 1, $P = .003$).

• Prevalence according to age
  • Four studies
    • Increasing prevalence according to age ($\chi^2 = 6067$, df = 1, $P < .001$).
Frailty: Prevalence Predicting Outcomes

- Retrospective population-based cohort study of long stay home care clients in Ontario Canada.
- Used the Resident Assessment Instrument for Home Care (RAI-HC) data, RAI-HC embedded tool CHESS scale, full frailty Index and modified frailty index.
Frailty: Prevalence Predicting Outcomes

**Table 1** Baseline characteristics, frailty status, and study outcomes among long-stay home care recipients in Ontario (Continued)

<table>
<thead>
<tr>
<th>Frailty status</th>
<th>Full Frailty Index [FI]</th>
<th>Modified Frailty Index [FI]</th>
<th>CHESS Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Robust</td>
<td>Robust</td>
<td>Robust</td>
</tr>
<tr>
<td></td>
<td>108,676 (46.3 %)</td>
<td>95,209 (40.6 %)</td>
<td>55,241 (23.6 %)</td>
</tr>
<tr>
<td></td>
<td>Pre-Frail</td>
<td>80,155 (34.2 %)</td>
<td>82,107 (35.0 %)</td>
</tr>
<tr>
<td></td>
<td>Frail</td>
<td>45,721 (19.5 %)</td>
<td>57,236 (24.4 %)</td>
</tr>
</tbody>
</table>

**Table 3** Summary of agreement between frailty measures

<table>
<thead>
<tr>
<th>Frailty index comparison</th>
<th>Agreement (%)</th>
<th>Weighted Kappa (95 % CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Frailty Index [FI] - Modified Frailty Index [FI]</td>
<td>77.0</td>
<td>0.72 (0.72–0.73)</td>
</tr>
<tr>
<td>Full Frailty Index [FI] - CHESS scale</td>
<td>43.9</td>
<td>0.28 (0.28–0.29)</td>
</tr>
<tr>
<td>Modified Frailty Index [FI] - CHESS scale</td>
<td>42.1</td>
<td>0.22 (0.22–0.23)</td>
</tr>
</tbody>
</table>

*Confidence interval

*ALC* Alternative Level of Care, CHESS Changes in Health, End-stage disease and Signs and Symptoms; LTC Long-Term Care

* - Outcome categories are not mutually exclusive
## Frailty: Prevalence Predicting Outcomes

### Table 4

<table>
<thead>
<tr>
<th>Frailty Index</th>
<th>Model</th>
<th>Frailty level</th>
<th>Outcomes at one year, risk ratio (95% CI)</th>
<th>Death</th>
<th>LTC admission</th>
<th>Hospitalization</th>
<th>Hospitalization with ALC stay</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Full frailty index [Fl]</strong></td>
<td>Unadjusted</td>
<td>Pre-Frail</td>
<td>1.47 (1.44, 1.50)</td>
<td>2.21 (2.16, 2.27)</td>
<td>1.19 (1.18, 1.20)</td>
<td>1.44 (1.41, 1.48)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Frail</td>
<td>2.43 (2.38, 2.49)</td>
<td>3.92 (3.83, 4.01)</td>
<td>1.26 (1.24, 1.28)</td>
<td>1.59 (1.55, 1.63)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adjusted c</td>
<td>Pre-Frail</td>
<td>1.45 (1.42, 1.48)</td>
<td>2.20 (2.15, 2.26)</td>
<td>1.17 (1.16, 1.19)</td>
<td>1.42 (1.39, 1.45)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Frail</td>
<td>2.32 (2.27, 2.37)</td>
<td>3.84 (3.75, 3.93)</td>
<td>1.22 (1.20, 1.23)</td>
<td>1.51 (1.47, 1.55)</td>
<td></td>
</tr>
<tr>
<td><strong>Modified frailty index [Fl]</strong></td>
<td>Unadjusted</td>
<td>Pre-Frail</td>
<td>1.36 (1.33, 1.39)</td>
<td>2.13 (2.08, 2.19)</td>
<td>1.16 (1.15, 1.17)</td>
<td>1.40 (1.37, 1.44)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Frail</td>
<td>2.26 (2.22, 2.31)</td>
<td>3.64 (3.55, 3.73)</td>
<td>1.25 (1.24, 1.27)</td>
<td>1.57 (1.53, 1.61)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adjusted c</td>
<td>Pre-Frail</td>
<td>1.35 (1.32, 1.38)</td>
<td>2.11 (2.05, 2.16)</td>
<td>1.15 (1.14, 1.16)</td>
<td>1.38 (1.35, 1.41)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Frail</td>
<td>2.16 (2.12, 2.21)</td>
<td>3.58 (3.50, 3.67)</td>
<td>1.21 (1.20, 1.23)</td>
<td>1.50 (1.47, 1.54)</td>
<td></td>
</tr>
<tr>
<td><strong>CHESS scale</strong></td>
<td>Unadjusted</td>
<td>Pre-Frail</td>
<td>1.30 (1.26, 1.34)</td>
<td>1.39 (1.35, 1.43)</td>
<td>1.17 (1.15, 1.19)</td>
<td>1.30 (1.26, 1.34)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Frail</td>
<td>2.36 (2.30, 2.43)</td>
<td>1.96 (1.91, 2.02)</td>
<td>1.40 (1.38, 1.41)</td>
<td>1.69 (1.64, 1.74)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adjusted c</td>
<td>Pre-Frail</td>
<td>1.29 (1.25, 1.33)</td>
<td>1.40 (1.36, 1.44)</td>
<td>1.15 (1.13, 1.17)</td>
<td>1.28 (1.25, 1.32)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Frail</td>
<td>2.27 (2.21, 2.33)</td>
<td>1.99 (1.94, 2.04)</td>
<td>1.34 (1.32, 1.36)</td>
<td>1.62 (1.58, 1.67)</td>
<td></td>
</tr>
</tbody>
</table>

*ALC* Alternative Level of Care, *CI* Confidence Interval, *ED* Emergency Department

a – Robust individuals serve as the reference category
b – Individuals hospitalized without an ALC stay removed from analysis (N = 66,764)
c – Adjusted for age, sex, and number of ADG comorbidity categories
Frailty: Quality of Life

  • Systematic Review – 13 studies (11 cross-sectional/2 prospective)
    • 11 cross-sectional studies consistently showed an association between frailty and worse quality of life, regardless of the different frailty criteria and quality-of-life tools used.
  • Most common assessment used Fried Phenotype
    • Although physical frailty used effects on mental components on quality of life significant. if defined mainly physically, can have significant
  • Meta Analysis
    • Four cross-sectional studies compared quality of life measured by the 36-Item Short Form Health Survey (SF-36) across frail, prefrail and robust defined by Fried criteria.
Frailty: Determining needs for services

- Both the frailty phenotype and the frailty index are associated with the use of health care in the community.
- The frailty phenotype is also associated with admission to nursing homes.
- Tilburg Frailty Indicator seems to be linked to the use of a wide range of health services.

Frailty: Interventions

• Goals of Interventions
  • Improve quality of life
  • Decrease prevalence of frailty
  • Decrease adverse outcomes from frailty
Frailty Interventions: Exercise

- Many studies on exercise intervention for other disease processes show improvement.

<table>
<thead>
<tr>
<th>DISEASE</th>
<th>STUDY</th>
<th>RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHRONIC PAIN</td>
<td>75 NH patients</td>
<td>• Significant difference in pain</td>
</tr>
<tr>
<td></td>
<td>• 8 week physical exercise program one hour per week</td>
<td>• Significant increase in mobility but none for ADLS in the pain group.</td>
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<tr>
<td></td>
<td>• 15 minute warm-up, muscle strengthening, stretching, balance,</td>
<td>• No significant increase in ADLSs or mobility in the no pain group.</td>
</tr>
<tr>
<td></td>
<td>.acupressure and massage</td>
<td>• Positive relationship between ADLs and mobility</td>
</tr>
<tr>
<td></td>
<td>• Specific exercises to relieve pain in specific areas.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Pain, ROM, ADLs and Mobility measured</td>
<td></td>
</tr>
<tr>
<td>MOBILITY AND FALLS</td>
<td>• Enhanced Medical Rehabilitation (EMR), a high-intensity and high-</td>
<td>Improved gait speed and 6 minute walk compared to standard of care.</td>
</tr>
<tr>
<td></td>
<td>engagement physical activity</td>
<td></td>
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<tr>
<td></td>
<td>• Patient directed</td>
<td></td>
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<tr>
<td></td>
<td>• Increased rehabilitation intensity</td>
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<tr>
<td></td>
<td>• Frequent feedback on effort and progress</td>
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<tr>
<td></td>
<td>• 26 postacute rehabilitation participants</td>
<td></td>
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<tr>
<td></td>
<td>• Randomized controlled trial</td>
<td></td>
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<tr>
<td>DEPRESSION</td>
<td>• Enhanced Medical Rehabilitation</td>
<td>• Significant improvement in depressive symptoms and function.</td>
</tr>
<tr>
<td></td>
<td>• Aerobic exercise at a dose consistent with public health</td>
<td>• Effective treatment for major depressive disorder of mild to</td>
</tr>
<tr>
<td></td>
<td>recommendations (17.5-kcal/kg/week)</td>
<td>moderate severity</td>
</tr>
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<tr>
<td></td>
<td><a href="http://dx.doi.org/10.1016/j.arr.2014.05.002">http://dx.doi.org/10.1016/j.arr.2014.05.002</a></td>
<td></td>
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<tr>
<td>COGNITION</td>
<td>• Resistance training versus stretching/toning.</td>
<td>• Resistance training has a greater impact on reasoning</td>
</tr>
<tr>
<td></td>
<td>• Tai Chi versus no exercise</td>
<td>• Tai Chi showed significant improvements over no exercise in measures of</td>
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<tr>
<td></td>
<td>• Functional task exercise, light stretching, unilateral movement,</td>
<td>attention and processing speed</td>
</tr>
<tr>
<td></td>
<td>bimanual movement, and task switching</td>
<td>• Significant effects, over cognitive training, on cognitive domains,</td>
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<td>functional status and everyday problem solving ability.</td>
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Frailty Interventions: Exercise

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<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Exercise group</th>
<th>Control group</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exercise group</td>
<td>Control group</td>
<td>IV. Random, 95% CI</td>
</tr>
<tr>
<td>Hauer 2003</td>
<td>19.7</td>
<td>15.8</td>
<td>-10.50 [-16.49, -4.51]</td>
</tr>
<tr>
<td>Latham 2003</td>
<td>19.5</td>
<td>11.3</td>
<td>8.20 [3.65, 12.75]</td>
</tr>
<tr>
<td>Peri 2008</td>
<td>30.2</td>
<td>29.8</td>
<td>0.40 [-0.41, 1.21]</td>
</tr>
</tbody>
</table>

Total (95% CI) 207 193 100.0% -0.11 [-2.98, 2.75]

Heterogeneity: Tau² = 4.93; Chi² = 52.03, df = 2 (P < 0.001); I² = 96%
Test for overall effect: Z = 0.08 (P = 0.94)

B

<table>
<thead>
<tr>
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<th>Exercise group</th>
<th>Control group</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exercise group</td>
<td>Control group</td>
<td>IV. Fixed, 95% CI</td>
</tr>
<tr>
<td>Hauer 2003</td>
<td>0.71</td>
<td>0.51</td>
<td>0.20 [0.09, 0.31]</td>
</tr>
<tr>
<td>Rosendahl 2006</td>
<td>0.57</td>
<td>0.54</td>
<td>0.03 [-0.03, 0.09]</td>
</tr>
<tr>
<td>Timonen 2002</td>
<td>0.91</td>
<td>0.79</td>
<td>0.12 [-0.07, 0.31]</td>
</tr>
<tr>
<td>Wolf 2006</td>
<td>1.07</td>
<td>1.02</td>
<td>0.05 [-0.09, 0.19]</td>
</tr>
</tbody>
</table>

Total (95% CI) 225 234 100.0% 0.07 [0.02, 0.11]

Heterogeneity: Chi² = 7.44, df = 3 (P = 0.06); I² = 60%
Test for overall effect: Z = 2.82 (P = 0.005)

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<table>
<thead>
<tr>
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<th>Control group</th>
<th>Mean Difference</th>
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<tr>
<td></td>
<td>Exercise group</td>
<td>Control group</td>
<td>IV. Fixed, 95% CI</td>
</tr>
<tr>
<td>Binder 2002</td>
<td>52.5</td>
<td>50.9</td>
<td>1.60 [0.15, 3.05]</td>
</tr>
<tr>
<td>Rosendahl 2006</td>
<td>29.5</td>
<td>28.6</td>
<td>0.90 [-0.44, 3.44]</td>
</tr>
<tr>
<td>Timonen 2002</td>
<td>44.9</td>
<td>41.1</td>
<td>3.80 [-1.00, 8.60]</td>
</tr>
</tbody>
</table>

Total (95% CI) 182 174 100.0% 1.69 [0.56, 2.82]

Heterogeneity: Chi² = 0.80, df = 2 (P = 0.67); I² = 0%
Test for overall effect: Z = 2.93 (P = 0.003)

Chou CH et al. 2012 Arch Phys Med Rehabil
Frailty Interventions: Exercise

- **Normal gait speed**
  - mean improvement 0.07 m/s; [95% CI, 0.04–0.09]

- **Fast gait speed**
  - mean improvement 0.08 m/s; [95% CI, 0.02–0.14]

- **Short physical performance battery scores**
  - mean improvement, 2.18; [95% CI, 1.56–2.80]

- no consistent effect on balance or ADL functional mobility.

- Evidence comparing different modalities of exercise was scarce
Frailty Interventions: Exercise

• HOPE
  • The Home-based Older People’s Exercise programme pilot
  • Strengthening exercises for muscle groups required for basic mobility skills like getting gout of bed, standing up from a chair, walking a shot distance and toileting
  • Stratified based on performance on the timed-up-and-go test (TUGT).
    • ≥ 30 sec - Level 1
    • 20-29 sec- Level 2
    • <20 s – Level 3

Frailty Interventions: Exercise

• HOPE
  • 12 week intervention (<15 minutes to complete/ 3 times a day/ 5 days of week)
    • 5 repetitions of each exercise routine -> 10-15 repetitions
    • Weekly support from therapist 5 face-to-face and 7 telephone calls.
  • Participants
    • 40 intervention/30 control
Frailty Interventions: Exercise

• Primary outcome: Mobility as measured by TUGT
• Secondary outcome: Barthel ADL, Erux QOL Group 5 Dimension Self-Report Questionnaire, and Geriatric Depression Scale.

• Outcome
  • Non-significant trend towards a clinically important improved outcome in the intervention group. No differences in secondary outcome.
Frailty Interventions: Exercise

- Systematic review of 9 articles of frail older adults in an exercise intervention program from 2003-2015
  - Benefits
    - 3 improved falls
    - 4 on enhancement of mobility
    - 1 enhancement of balance
    - 2 improvement in functional ability
    - 5 improved muscle strength
    - 1 improved frailty based on the Fried’s criteria

De Labra C et.al BMC Geriat 2015;15:154
Frailty Interventions: Nutrition

- Preventive Effect of Protein-Energy Supplementation on the Functional Decline of Frail Older Adults With Low Socioeconomic Status: A Community-Based Randomized Controlled Study

  - Overall physical functioning did not change in the control group but improved by 5.9% in the intervention group.
  - The short physical performance battery score declined by 12.5% in the control group, but remained stable in the intervention group.
  - Gait speed decreased in both groups, but to a greater extent in the control group (11.3%) compared with the nutrition intervention group (1.1%).
  - The Timed Up and Go score decreased by 11.3% in the controls, whereas it increased by 7.2% in the nutrition group.
  - There were no changes in either group in hand grip strength or 1-legged standing performance.

Frailty Interventions: Nutrition

- Dietary protein intake in community dwelling frail and institutionalized elderly people: scope for improvement
- RCT: 24 weeks of dietary protein supplementation on muscle mass, strength, and physical performance in 65 frail older people, defined by Fried’s criteria
  - Skeletal muscle mass and type I and II muscle fibers did not change in any group.
  - Muscle strength (leg extension strength) increased from 57.5 to 68.5 kg in the protein group compared with an increase from 57.5 to 63.5 kg in the placebo group.
  - Physical performance (measured with the short physical performance battery) improved significantly from 8.9 to 10.0 of 12 points in the protein group, but did not change in the placebo group (from 7.8 to 7.9 points).

Frailty Interventions: Behavior Change

• Exploratory Systematic Review
• 22 interventions in 19 eligible trials
• Assessment
  • 19 physical function outcomes
  • 4 behavioral outcomes
• Effectiveness
  • At most 50% in behavior and 42% on physical functioning
• Techniques
  • Instruction on how to perform behavior, adding object to environment, restructuring environment
  • Functions of education and enablement

Garner et al. BMJ Open 2017;7
Frailty: Home care interventions

• Using the interRAI Home Care Instrument
  • RAI: Comprehensive geriatric assessment tool validated for use in different settings
    • Home care interventions

• Translation into practice
  • Consider home care agency evaluations and documentations in evaluating your interventions.

De Almeida Mello J, et.al. JAMDA 2015,16:173
**Frailty: Home-Based Care**

- Effects of home-based primary care on Medicare costs.

<table>
<thead>
<tr>
<th>Frailty Category</th>
<th>Cases, n = 722</th>
<th>Controls, n = 2,161</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicare-eligible months (95% CI)</td>
<td>23.3 (22.1–24.5)</td>
<td>24.2 (23.6–24.9)</td>
<td>.18</td>
</tr>
<tr>
<td>JEN Frailty Index, $ (95% CI)$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0–3 (low)</td>
<td>22,611 (15,667–29,554)</td>
<td>19,146 (16,076–22,217)</td>
<td>.37</td>
</tr>
<tr>
<td>4–6 (medium)</td>
<td>42,223 (36,670–47,775)</td>
<td>43,383 (39,781–46,985)</td>
<td>.73</td>
</tr>
<tr>
<td>≥7 (high)</td>
<td>58,689 (50,946–66,432)</td>
<td>76,827 (70,840–82,814)</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

The follow-up period began in the month after the index month and extended until the month of death, last month of fee-for-service eligibility, or end of the study period in December 2008.

* The JEN Frailty Index sums the presence (score = 1) or absence (score = 0) of 13 categories of illness linked to need for long-term care services, including institutionalization and healthcare costs.

Frailty Intervention: Multifactorial

- Multifactorial interdisciplinary program
  - Physical therapy, psychologist and health care worker.
  - Decreased prevalence of frailty compared with usual care

- RCT 241 frail older adults recently discharged from rehabilitation.
  - Multifactorial focus on gait speed, mobility related disability, achievement of mobility related goals, and self report of participation in multiple areas of life.
    - No change in gait speed
    - Improvement in all other areas.

- Focused intervention on specific frailty components results in improvements.
  
Frailty Interventions: Multifactorial Intervention

Effects of a primary care based multifactorial intervention on physical and cognitive frailty

- Randomized clinical trial
- 347 participants completed
  - Mean age 77.3 years
  - prefrail 25.3% and 75.3% frail
- 12-week multidisciplinary intervention or usual care.
  - exercise training, intake of hyperproteic nutritional shakes, memory training, and medication review

- Outcomes
  - Physical Dimensions: Short Performance Physical Batteray, Handrip dynamometer, functional reach, unipodal station test of balance
  - Neuropsychological performance battery 6 tests
  - Number of medications

doi:10.1093/gerona/glx259
Frailty Interventions: Multifactorial Intervention

<table>
<thead>
<tr>
<th>Physical tests</th>
<th>Control Group N = 176</th>
<th>Intervention Group N = 176</th>
<th>Adjusted Mean Difference (95% CI) Between Groups (IG-CG)</th>
<th>p Value</th>
<th>SES</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPPB (range 0–12)</td>
<td>Mean (SD)a</td>
<td>Mean (SD)a</td>
<td>Between Groups (IG-CG)b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-I</td>
<td>7.3 (2.4)</td>
<td>7.1 (2.3)</td>
<td>1.58 (1.29–1.86)</td>
<td>&lt;.001</td>
<td>1.18</td>
</tr>
<tr>
<td>Post-3 mo</td>
<td>6.8 (2.3)</td>
<td>8.1 (2.2)</td>
<td>1.36 (0.89–1.83)</td>
<td>&lt;.001</td>
<td>0.69</td>
</tr>
<tr>
<td>Post-18 mo</td>
<td>7.0 (2.6)</td>
<td>8.1 (2.3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handgrip (kg)</td>
<td>Mean (SD)a</td>
<td>Mean (SD)a</td>
<td>Between Groups (IG-CG)b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-I</td>
<td>16.5 (7.4)</td>
<td>16.5 (7.7)</td>
<td></td>
<td>&lt;.001</td>
<td>1.12</td>
</tr>
<tr>
<td>Post-3 mo</td>
<td>15.8 (6.9)</td>
<td>18.6 (7.7)</td>
<td>2.86 (2.32–3.41)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-18 mo</td>
<td>15.7 (7.8)</td>
<td>18.2 (7.9)</td>
<td>2.49 (1.09–3.89)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functional reach (cm)</td>
<td>Mean (SD)a</td>
<td>Mean (SD)a</td>
<td>Between Groups (IG-CG)b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-I</td>
<td>82.2 (9.3)</td>
<td>80.7 (10.1)</td>
<td>4.43 (3.35–5.32)</td>
<td>&lt;.001</td>
<td>0.96</td>
</tr>
<tr>
<td>Post-3 mo</td>
<td>80.7 (8.8)</td>
<td>83.5 (9.3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-18 mo</td>
<td>79.7 (10.5)</td>
<td>82.7 (10.7)</td>
<td>4.52 (2.32–6.72)</td>
<td>&lt;.001</td>
<td>0.47</td>
</tr>
<tr>
<td>Unipodal station (seconds)</td>
<td>Mean (SD)a</td>
<td>Mean (SD)a</td>
<td>Between Groups (IG-CG)b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-I</td>
<td>8.2 (9.7)</td>
<td>6.9 (8.0)</td>
<td>3.58 (2.57–4.59)</td>
<td>&lt;.001</td>
<td>0.75</td>
</tr>
<tr>
<td>Post-3 mo</td>
<td>7.3 (9.2)</td>
<td>9.6 (9.1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-18 mo</td>
<td>7.7 (9.0)</td>
<td>9.3 (8.7)</td>
<td>2.98 (1.11–4.84)</td>
<td>.002</td>
<td>0.37</td>
</tr>
<tr>
<td>Number of drugs/day</td>
<td>Mean (SD)a</td>
<td>Mean (SD)a</td>
<td>Between Groups (IG-CG)b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-I</td>
<td>6.6 (3.8)</td>
<td>7.7 (3.2)</td>
<td>-1.39 (-1.69 to -1.10)</td>
<td>&lt;.001</td>
<td>0.99</td>
</tr>
<tr>
<td>Post-3 mo</td>
<td>7.2 (4.0)</td>
<td>6.9 (3.2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-18 mo</td>
<td>7.5 (4.1)</td>
<td>7.5 (3.4)</td>
<td>-1.09 (-1.71 to -0.47)</td>
<td>.001</td>
<td>0.37</td>
</tr>
</tbody>
</table>
Frailty Interventions: General Management

- No screening tool is recommended
- Recognition
  - All encounters with health and social care include an assessment of some aspect of frailty
    - Gait speed
    - Timed-up-and-go test
    - PRISMA 7 (Program of Research on Integration of Services for the Maintenance of Autonomy)

- Management
  - Holistic medical review based on principles of comprehensive geriatric assessment

Frailty: Recommendations for providers

Frail older adults are living at home in the community and we can make an impact on their outcomes!

1. Recognize components of frailty
   1. Develop proficiency in some component measure, i.e. gate speed or TUGT
   2. Use some measure of ADLs and social involvement

2. Exercise prescription and nutritionist referral is usually indicated in the pre-frail.

3. Consider referral for home health care services, adult day care or integrated services (PACE program)
   1. Follow up for progress on desired components
Case 1 and 2: Interventions

- Where are these patients likely on the continuum?
- What interventions apply to each patient to address the following?
  - Improve quality of life
  - Decrease components of frailty
  - Decrease adverse outcomes from frailty
Case 1: Mr. H

- 96 year old Asian male who presented for an evaluation at the Geriatric Clinic.
  - PMH: HTN, osteoarthritis, inguinal hernia and BPH
  - His son arranged the appointment but he didn’t know the reason.
  - 4 weeks ago he fell down outside while doing yard work and was unable to get back up. He waited for his neighbors to return home and they assisted him and called the ambulance.

- Physical Exam:
  - Imbalance on Progressive Romberg
  - Walked 15 feet in 12 seconds
  - Completed 5 chair stands in 9.5 seconds
  - Strength normal in upper/lower extremity.
  - Short Blessed Test 10 (normal <9)
  - MoCA 18/30 (N>26)
Case 2: Mrs. B

- 70 year old African American woman returning for primary care in the readmission prevention clinic
  - PMH: HTN, DM, COPD (oxygen dependent), OSA, and SVT
  - Utilization: 3 ER visits in the last month and one hospitalization in the last year. Was admitted up to 5 times in a year before enrolling in the clinic 4 years ago.
  - PMH: Hypertension, Diabetes, COPD, and Hyperlipidemia
  - SH: Her son recently divorced and moved in with her. Stress related to son’s divorce. Stairs within her apartment. No tobacco and occasional alcohol. 2 falls in the last year. Assistance with IADLs
  - Examination:
    - Pulmonary examination: 6 minute walk, ambulated 450 feet and required 15 L oxygen with exertion.
    - MoCA score 19
    - Upper and lower extremity strength bilaterally 3-4/5
    - Grip Strength 4/5
    - PHQ9= 8
Take Home Messages

• Frailty is a complex syndrome which results in increased adverse outcomes.
• Recognizing components of frailty and risk of frailty should be evaluated in all community dwelling adults
• Exercise, nutrition, and multidomain interventions in combination do show promise in improvement in components of frailty and quality of life.
• Home based primary care should be considered in the most frail.
THANK YOU

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