Restricting Back Pain and Subsequent Mobility Disability in Community-Living Older Persons

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Evidence-Based Medicine


Why Aging Population Matters

- 65+: 500 million (2006) → 1 billion (2030)
- NIA: “very large increase in disability caused by increases in age-related” disease (arthritis and back pain)
  - Implications for social support systems, resources, economy
  [Link to NIA report]

Importance of Back Pain in Older Persons

- Rheumatologists, Geriatricians, Internists, Surgeons, PT… see many patients with back pain (Deyo, 2006)
- Given the shifting demographics, expect:
  - ↑ prevalence (Freburger, 2009)
  - Morbidity (MMWR, 2009)
  - Cost (Katz, 2006)
- Most literature in younger working populations

What We Know in Older Persons

- Back pain is common: 6-73%
- Associated with significant morbidity:
  - Disability in ADL
  - Poor self-reported health
  - Increased utilization of resources
  (Edmond, 2000; Jacobs, 2006; Reid, 2005)

Disclosures

I have no relevant financial relationships to disclose.
Gaps in the Literature

- For older persons with non-specific, mechanical back pain, prevention/treatment planning difficult because few prospective data exist describing impact (disability)
- Loss of independent mobility → higher rates of morbidity and mortality, poorer quality of life

Research Objective

To evaluate the association between back pain and mobility disability over time, in older men and women

Study Design

Prospective cohort
- Yale Precipitating Events Project (PEP)
- 754 community-living persons, 70+ yrs
- Assembled 3'/98-10'/99 → on-going
- Initially non-disabled in ADLs
- Overall participation rate = 75%

Data Collection

- Restricting back pain (independent variable) and disability (outcome)
  - Assessed monthly with phone interviews
- Covariates
  - Updated every 18 months at comprehensive face to face interviews
- Follow-up over 13+ yrs
  - Completion rate = 99%

Case Definition

- Restricting Back Pain (RBP):
  - staying in bed for ≥½ a day and/or
  - cutting down on usual activities
- Definition of RBP:
  - face validity

Measuring RBP Over Time

Episode = ≥1 monthly report of RBP

Example Subject

Baseline 18 Months 36 Months
Disability Outcome

- Mobility disability - self-reported
  - Needing help with/ inability to complete
    - Walking quarter mile
    or
    - Climbing flight of stairs
    or
    - Lifting/carrying 10 pounds

Disability Outcome- 3 Analyses

- Primary Analysis
  - Any mobility disability (n=709)
- Secondary Analyses
  - Persistent mobility disability (lasting 2+ months) (n=709)
  - Excluding mobility disability at baseline (n=496)

Covariates

- Selected based on literature
  - Fixed in time: sex, ethnicity, education
  - Time-varying: age, depressive symptoms, BMI, physical frailty, cognitive impairment, chronic conditions, hip weakness

Data Analysis

- PEP participant characteristics
- Descriptive statistics of disability events
  - Event rate for mobility disability
    - GEE Poisson model
    - Duration
- Primary and Secondary Analyses
  - Adjusted associations between RBP and subsequent disability
  - Recurrent events Cox model
- Interaction with sex

Characteristics of Participants

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Baseline (n = 709)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean (SD)</td>
<td>78.3 (5.2)</td>
</tr>
<tr>
<td>Women, n (%)</td>
<td>447 (63)</td>
</tr>
<tr>
<td>Non-Hispanic white, n (%)</td>
<td>643 (90.7)</td>
</tr>
<tr>
<td>Did not complete high school, n (%)</td>
<td>228 (32.2)</td>
</tr>
<tr>
<td>Comorbidities, mean # (SD)</td>
<td>1.5 (1.1)</td>
</tr>
<tr>
<td>Arthritis, n (%)</td>
<td>206 (29)</td>
</tr>
<tr>
<td>Hypertension, n (%)</td>
<td>389 (55)</td>
</tr>
<tr>
<td>Depressive symptoms, n (%)</td>
<td>134 (18.9)</td>
</tr>
<tr>
<td>MMSE score &lt; 24, n (%)</td>
<td>77 (10.9)</td>
</tr>
</tbody>
</table>

Frequency of Baseline Disability

- Walking quarter mile: 20%
- Climbing flight of stairs: 6.6%
- Lifting/carrying 10 pounds: 19%

- 213/709 (30%) had 1+ disability at baseline, but recovered during f/u
  - Eligible for subsequent disability events
Descriptive Statistics for Mobility Disability

- Event rate
  - 7.3 per 100-person months (95% CI 6.89, 7.64)
- Average duration
  - Median duration: 2 months (interquartile range 1-4)

Primary Analysis (n=709)
Recurrent Events Cox Model

<table>
<thead>
<tr>
<th>Model</th>
<th>Hazard Ratio</th>
<th>95% CI</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1*</td>
<td>Unadjusted</td>
<td>3.53</td>
<td>3.13-3.97</td>
</tr>
<tr>
<td>2**</td>
<td>Adjusted</td>
<td>3.23</td>
<td>2.87-4.27</td>
</tr>
</tbody>
</table>

*Model 1 includes RBP occurrence (yes/no) in month prior as sole predictor
**Model 2 adjusted RBP for 11 covariates: age, female, nonwhite, living alone, less than high school education, depressive symptoms, overweight, frailty, cognitive impairment, chronic conditions, hip weakness

Secondary Analysis (n=709)
Persistent Disability (Lasting 2+ months)
Recurrent Events Cox Model

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<td>3.38-4.52</td>
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<td>2**</td>
<td>Adjusted</td>
<td>3.64</td>
<td>3.15-4.20</td>
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Secondary Analysis (n=496)
Excluding Participants w Baseline Mobility Disability
Recurrent Events Cox Model

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Interactions

- Tested interactions of gender with restricting back pain: Gender (p=0.68)
Summary

• Restricting back pain was strongly associated with mobility disability among older persons
• Association remained with three different analyses
• Relationship between RBP and mobility disability did not differ between men and women

Strengths

• First population based, prospective study to determine impact of RBP on mobility disability in older adults
• Take advantage of monthly data on back pain and disability; updated covariates every 18-months, for 13+ years

Limitations

• Etiology of RBP not ascertained
• Unable to determine # days/month of RBP
• Generalizability limited

Significance

• Increase awareness of impact of restricting back pain on mobility disability
• Interventions designed to decrease restricting back pain may also improve outcomes related to maintain mobility tasks

Support

• The investigators retained full independence in the conduct of this research
• Dr. Makris was supported by the NIA Training Program in Geriatric Clinical Epidemiology and Aging-Related Research (T32AG19134), and is currently supported by the ACR RRF-ASP Junior Career Development Award in Geriatric Medicine, NIA GEMSSTAR RO3, and in part by the UTSW CTSA
• Dr. Fraenkel is supported by NIH/NIAMS, VA HSRD, AF, ACR RRF
• Dr. Gill is supported by NIH/NIA, Donaghue Foundation

Thank you
**Monthly Assessment of RBP**

Restricted Activity due to RBP

Q1: Since we last talked on ____, have you stayed in bed at least half the day due to an illness, injury, or other problem?

OR

Q2: Since we last talked, have you cut down on your usual activities due to an illness, injury, or other problem?

If yes to Q1 and/or Q2, participant asked:

4a: Since we last talked, have you had pain or stiffness in your back?

4b: Did this problem cause you to stay in bed at least half the day or to cut down on your usual activities?