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Original Study

Risk Factors for Restricting Back Pain in Older Persons

Una E. Makris MD [a,b,*], Liana Fraenkel MD, MPH [c,d], Ling Han MD, PhD [c], Linda Leo-Summers MPH [c], Thomas M. Gill MD [c]

[a] Department of Internal Medicine, Division of Rheumatic Diseases, UT Southwestern Medical Center, Dallas, TX
[b] Department of Medicine, Division of Rheumatology, Veterans Administration Medical Center, Dallas, TX
[c] Department of Medicine, Yale School of Medicine, New Haven, CT
[d] Department of Internal Medicine, Division of Rheumatology, Veterans Administration Medical Center, West Haven, CT

ABSTRACT

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Objectives: To identify risk factors for back pain leading to restricted activity (restricting back pain) in older persons.
Design: Prospective cohort study.
Setting: Greater New Haven, Connecticut.
Participants: A total of 731 men and women aged 70 years or older, who were community living and nondisabled in essential activities of daily living at baseline.
Measurements: Candidate risk factors were ascertained every 18 months for 108 months during comprehensive home-based assessments. Restricting back pain was assessed during monthly telephone interviews for up to 126 months. Incident episodes of (1) short-term (1 episode lasting 1 month) restricting back pain; and (2) persistent (1 episode lasting 2 or more months) or recurrent (2 or more episodes of any duration) restricting back pain were determined during each 18-month interval. The associations between the candidate risk factors and short-term and persistent/recurrent restricting back pain, respectively, were evaluated using a multivariable Cox model.
Results: The cumulative incidence was 21.3% (95% confidence interval [CI] 19.6%–23.1%) for short-term restricting back pain and 20.6% (CI 18.6%–22.9%) for persistent/recurrent restricting back pain over a median follow-up of 109 months. In a recurrent event multivariable analysis, female sex (hazard ratio [HR] 1.30; 1.07–1.58), weak grip strength (HR 1.24; 1.01–1.52), and hip weakness (HR 1.19; 1.07–1.32) were independently associated with an increased likelihood of having short-term restricting back pain, whereas female sex (HR 1.48; CI 1.13–1.94), depressive symptoms (HR 1.57; 1.23–2.00), 2 or more chronic conditions (HR 1.38; 1.08–1.77), and arthritis (HR 1.66; 1.31–2.09) were independently associated with persistent/recurrent restricting back pain.
Conclusion: In this prospective study, several factors were independently associated with restricting back pain, including some that may be modifiable and therefore potential targets for interventions to reduce this common and often recurrent condition in older persons.

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Back pain is the most common type of pain reported by adults. More than 26% of adults report back pain lasting for at least 1 day in the past 3 months, and 2.3% of all office-based physician visits are related to this common condition.[1] The total health care expenditures for back pain, in 2005 dollars, exceeded $100 billion,[2] and these costs are expected to rise as the prevalence of back pain increases.[3] Factors that may contribute to long-term disability from back pain include age, prior back pain, below average self-reported health, strenuous

work, unemployment, dissatisfaction with employment, and psychological distress.[4,5] Much of the literature on this condition comes from younger populations. Whether these findings are applicable to older populations is uncertain.

Despite the high prevalence, cost, and morbidity attributable to back pain, longitudinal data describing its epidemiology in older persons are sparse. In an earlier report, we demonstrated that back pain, severe enough to restrict activity (hereafter referred to as restricting back pain), in older persons is common, affecting about 80% of men and women over a decade, often short-lived, with median duration of only 1 month, and recurrent.[6] Previous studies have shown that back pain in older persons is more common in women than men,[1,3,6–10] persons who are overweight,[7,10,11] and those who are depressed or have depressive symptoms.[7–9,12] Most of this literature, however, is cross-sectional and focuses exclusively on chronic (lasting $\geq$ 3 months) back pain. Few prospective studies have evaluated risk factors for restricting back pain, especially episodes that are short-lived or recurrent.[13,14]

The objective of this study was to identify independent risk factors for restricting back pain in older persons. We used data from a unique longitudinal study that includes monthly assessments of restricting back pain, and potential risk factors that were assessed every 18 months, for more than 10 years in a large cohort of older men and women who were community-living at baseline. Our goal was to identify factors that render older persons prone to developing restricting back pain, and, ultimately, to recognize which older individuals may require more aggressive prevention or treatment strategies to prevent the occurrence, persistence, or recurrence of this common condition.

Methods

Study Population

Participants were members of the Precipitating Events Project (PEP), a prospective study of 754 nondisabled persons, aged 70 years or older, who were initially residing in the community.[15] Exclusion criteria included the need for personal assistance in 1 or more of 4 essential activities of daily living (ADLs): bathing, dressing, walking inside the house, and transferring from a chair; significant cognitive impairment with no available proxy; inability to speak English; diagnosis of a terminal illness with a life expectancy less than 12 months; and plans to move out of the New Haven area during the following 12 months. Participants who subsequently developed disability or moved into an institutional setting were retained in the cohort.

The assembly of the PEP cohort, which took place between March 1998 and October 1999, has been described in detail elsewhere.[15] Potential participants included age-eligible members of a large health plan in greater New Haven, Connecticut. Only 4.6% of the 2753 health plan members who were alive and could be contacted refused to complete the screening telephone interview; 75.2% agreed to participate in the study. Those who refused to participate did not differ significantly by sex or age from those who enrolled in the study.[15] The Yale Human Investigation Committee approved the study protocol.

Data Collection

Data on candidate risk factors were collected during comprehensive home-based assessments completed at baseline and every 18 months for 108 months. Restricting back pain was assessed during monthly telephone interviews for up to 126 months. For participants with significant cognitive impairment or who were not available, these assessments were completed with the assistance of a designated proxy; this protocol has been shown to be reliable and valid as described in previous reports.[16] Of the 754 participants in the original cohort, 452 (59.9%) died after a median follow-up of 74 months, and 35 (4.6%) dropped out of the study after a median follow-up of 25 months. Data were otherwise available for 99.6% of the 61,183 monthly interviews.

Candidate Factors

Potential risk factors for restricting back pain were evaluated from 5 domains: demographic, cognitive-psychosocial, health related, habitual, and physical capacity (Table 1). These factors have been linked to adverse functional outcomes in prior studies.[17–19] Demographic factors included age, sex, race, living situation (living alone: yes/no), and education. Cognitive-psychosocial factors included cognitive status assessed by the Folstein Mini-Mental State Examination (MMSE)[20]; depressive symptoms assessed by the Center for Epidemiologic Studies Depression (CES-D) scale[21]; functional self-efficacy assessed by the modified Tinetti scale[22]; and social support assessed by a modified version of the Medical Outcomes Study (MOS) Social Support Survey.[23] Health-related factors included self-report of a 10-pound or more weight loss over the course of a year,[24] and 8 self-reported, physician-diagnosed chronic conditions, reported as the number of chronic conditions: hypertension, diabetes mellitus, myocardial infarction, chronic lung disease, cancer, stroke, congestive heart failure, and hip fracture. Self-reported physician-diagnosed arthritis was evaluated separately.[18] The habitual factors included physical activity, as assessed using the Physical Activity Scale for the Elderly (PASE),[25] and body mass index (BMI) was calculated using participants' self-reported height and weight.

The physical capacity factors included a modified version of the Short Physical Performance Battery (SPPB)[26] that included the standard balance maneuvers but substituted 3 timed chair stands (instead of 5) and timed rapid gait (instead of timed usual gait), as previously described.[19] Physical capacity factors included hand grip strength,[27] and lower extremity (hip abduction) and upper extremity (shoulder abduction) strength.[19] The amount of missing data for the candidate risk factors was less than 1% in the baseline assessment and less than 10% in all subsequent assessments. To account for missing data, multiple imputation was used with 50 random draws per missing observation. Additional operational details regarding the candidate risk factors are provided in the next paragraph.

The candidate risk factors were dichotomized, as described in prior reports, to facilitate clinical interpretation.[19] Age was categorized as younger than 85 and 85 years or older and education was classified as completing fewer than 12 and 12 or more years of education. Participants were considered to be cognitively impaired if they scored lower than 24 on the MMSE, and to have high depressive symptoms if they scored 16 or higher on the CES-D. Low functional self-efficacy and low social support were defined based on cut points demarcating the worst quartile (score of $\leq$27 on the modified Tinetti scale,[22] and $\leq$18 on the MOS,[23] respectively) on the basis of the first 356 enrolled participants who were selected randomly from the source population. Chronic conditions were classified as fewer than 2 and 2 or more conditions (based on frequency distributions in this sample). Low physical activity was defined as a PASE score of lower than 64 for men and lower than 52 for women.[25] These sex-specific cut points denote the worst quintiles,[27] also determined from a random sample from the source population.[24] A BMI of 25 kg/m^2 or higher was used to define overweight (World Health Organization definition). The SPPB, measured on a 0 to 12 scale, was dichotomized as less than 7 and 7 or more on the basis of previously defined cut points.[28] Weak grip strength (dominant hand), assessed by averaging