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Feature Article

The impact of mobility limitations on health outcomes among older adults

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ABSTRACT

The purpose of this study was to stratify an older adult population for subsequent interventions based on functional ability, and to estimate prevalence, characteristics and impact of mobility limitations on health outcomes. In 2016, surveys were sent to a stratified random sample of AARP® Medicare Supplement insureds; mobility limitations were defined using two screening questions. Responses were stratified to three mobility limitation levels. Multivariate regression models determined characteristics and impact on health outcomes. Among weighted survey respondents (N = 15,989), severe, moderate and no limitation levels were 21.4%, 18.4% and 60.3%, respectively. The strongest predictors of increased limitations included pain and poor health. Individuals with more severe limitations had increased falls, decreased preventive services compliance and increased healthcare utilization and expenditures. Utilizing two screening questions stratified this population to three meaningful mobility limitation levels. Higher levels of mobility limitations were strongly associated with negative health outcomes. Mobility-enhancing interventions could promote successful aging.

Introduction

Mobility, including the ability to walk and/or climb stairs, is an important predictor of quality-of-life (QOL)[1–5] among older adults and a measure of successful aging.[6] Mobility limitations put older adults at risk for falls,[1,7–10] reduced access to medical services,[11–13] poor psychological health,[1–3,14–19] declining functional abilities[18–20] and negative health outcomes.[1,7–10,16,21,22] About 30% of older adults (range of 22.5%–46.7% in various studies) have mobility limitations.[11,13,22–25] The onset of chronic conditions, such as arthritis and chronic lung problems, are the most common causes of mobility-related disabilities in older adults.[13,18,26] Mobility problems, including changes in gait, are early indicators of health decline and subsequent disability.[3,4,11] Consequently, early interventions to prevent further limitations could benefit older adults in maintaining or regaining their daily activity levels, promoting healthy aging and QOL over time.

Mobility limitations are frequently associated with localized pain, often in the knee or back.[5,8,27,28] Low-level to debilitating pain or delayed recovery from mobility limitations can result in curtailed activities, which in turn can lead to deconditioning putting the person at increased risk for falls and subsequent disability.[5,8,9] Positive psychosocial attitudes, such as pain acceptance, when the individual is willing to engage in activities despite the pain, have been associated with less pain intensity, reduced pain interference and improved physical functioning.[27,28] For those suffering, pain management techniques including both pharmaceutical and non-pharmaceutical solutions could be integrated into mobility-enhancing interventions.

Mobility limitations, along with accompanying pain, increase the risk for recurrent falls.[5,7,8,10] Severe mobility limitations were shown to increase falls rates by almost 5-fold; with an associated falls history, by 15-fold.[7] Lack of balance, muscle weakness, unsteady gait, pain and certain medications are known falls risk factors.[9] About 30% of older adults fall each year, with 10% incurring injurious falls requiring medical attention.[10] Leading causes for falls include: accidents (31%), gait/weakness (17%) and dizziness/balance (13%),[9] further documenting the importance of problems with balance and walking to falls rates. As harmful as falls can be to the health of older adults, fear of falling, even without a documented

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fall, can set up a cycle leading to decreased activities, withdrawal from social engagements and reduced mobility, leading to further weakness, balance and gait issues and eventual disability.[2,9,10]

Psychosocial variables, such as social support, resilience and purpose in life, have been shown to mitigate the damaging effects of chronic disease and the perception of pain.[14,15,18–20,28–30] High resilience (i.e., recovery from adversity and coping skills) or high purpose in life (i.e., finding value and purpose in one's life) are protective against increases in mobility limitations and decreases in activities of daily living (ADLs) or instrumental activities of daily living (IADLs) that compromise the independence of older adults.[15,18–20,28] Purpose and/or resilience are associated with the motivation to engage in health-promoting activities including more physical activity, better nutrition and compliance with recommended preventive services.[20,31] Purpose and resilience are associated with both physical and mental health benefits.[19,20,32] Social support from family and friends can also be beneficial in recovery from mobility limitations and is protective from mental health issues, such as depression and anxiety.[14,29]

Mobility limitations, often associated with multiple chronic conditions, can compromise quality of care delivery by limiting access to specialists, follow-up care and preventive services.[11–13] In addition to transportation issues, access to physician's office space and examination rooms and inability to negotiate safe transfer to examination tables reduces access for those with mobility limitations, especially for those in wheelchairs.[11–13]

While mobility limitations have been identified as detrimental to older adult health, identifying those at risk has proven difficult. Early signs of limitations do not require medical services and, thus, are not well documented in medical diagnoses codes. Risk factors for mobility limitations including being older, female, less educated, having lower socioeconomic status, more chronic conditions and poorer health are not sufficiently distinct to operationalize in effective risk stratification.[4,13,17,19] Targeting individuals for interventions has primarily relied on self-report survey questions regarding functional abilities (e.g., difficulty walking or climbing stairs)[7,10,11,14,16,20,23,24,29,30] or measured functional testing (e.g., timed get up and go (TUG); timed 400 m walk).[1–3,5,13,22,33] To date, while self-reported measures have been validated,[34,35] survey distributions have limited exposure and questions on mobility issues have not been widely considered in clinical appointments.[10] Measured functional testing is even less scalable.[22,33] For population management approaches that could potentially engage large segments of older adults with targeted interventions, identification methodologies would need to be simple, effective, inexpensive and scalable.[7,21]

Stratification methodologies to target interventions have been tested in research settings including use of ADL or IADL disability levels[21] or stratification based on self-reported survey questions or measured functional abilities, usually including walking distances or climbing stairs criteria, from mild to severe mobility limitation or disability levels.[7,10,11,13,22,33] Validation of the utility of the levels for targeting has been documented using future falls[7] and mortality rates.[16,21,22] While these various stratification methodologies are effective, obtaining the information for implementation has proven to be problematic.

Effective interventions to improve mobility and prevent falls are well documented.[36–41] Mobility interventions including falls prevention approaches generally focus on balance and muscle strengthening exercises as most effective in addressing the primary cause of falls and mobility issues.[36,38,39,41] Falls assessments including safety and hazard identification treat a symptom of mobility limitations but have proven effective.[36] Yoga and tai chi have demonstrated improvements in balance and strength[37,40]; mindfulness meditation has been effective in managing pain associated with mobility limitations and chronic conditions.[42] While effective interventions for mobility limitations and falls are available, effective targeting to appropriate subgroups within broader populations of older adults and documented motivation methodologies to engage these older populations have yet to be developed.

While some studies have included Medicare populations,[10,11,21] we found no published research studies to date investigating mobility limitations among older adults with Medicare Supplement plans (i.e., Medigap).[43] While most (about 90%) of those with original fee-for-service Medicare coverage have some type of supplemental insurance coverage, between 27% and 30% (currently about 11.2 million adults) have also purchased Medigap coverage.[43] Since this population may differ from general older adult and/or specifically Medicare populations, it was of interest to determine the prevalence of mobility limitations in this subpopulation of older adults for the purpose of developing population health management strategies and associated interventions.

This study adds to the mobility limitation literature in utilizing two simple screening questions (i.e., trouble with walking or balance and trouble climbing status) to define three levels of increasing mobility limitation levels (none, moderate and severe) that could potentially be used to target individuals for subsequent interventions in a designated population. The utility of the three levels is documented in considering the prevalence and characteristics associated with increasing limitations and then validating the impact on selected health outcomes associated with these designated mobility limitation levels in a nationally representative Medigap population. Health outcomes were focused on objective measures of health from administrative databases.

Thus, our primary objective was to test the utility of utilizing two simple screening questions to stratify a population to severe, moderate and no mobility limitations by estimating the prevalence and associated characteristics among insureds in AARP Medicare Supplement plans. The secondary objective was to validate the impact of these mobility limitation levels on selected health outcomes: falls rates, preventive services compliance, healthcare utilization and expenditures. This research was covered under New England IRB (NEIRB) number 120160532.

Methods

Sample selection

In 2015, approximately 4.0 million Medicare insureds were covered by an AARP Medicare Supplement plan insured by UnitedHealthcare Insurance Company. These plans are offered in all 50 states, Washington DC and various US territories. From August through September 2016, AARP Medicare Supplement insureds were mailed surveys using a nationally randomized stratified methodology. To be eligible for this study, insureds must have been in a plan for a minimum of 12 months and to have been at least 65 years of age. The sample included 16,000 insureds where sicker members were oversampled as they often have lower response rates. Of survey respondents (N = 4664), those who did not match with eligibility files (N = 3) were excluded. Thus, the final study population included 4661 survey respondents. Their responses were then weighted to adjust for non-response bias and to be nationally representative. This weighted study sample will be the focus of the following analyses.

Survey

The mailed survey (49 questions) was developed by UnitedHealthcare and AARP Services, Inc. (ASI) to assess psychosocial aspects of health, including purpose in life, resilience, social