

Title:

A Model for Falls With Major Injury in Nursing Home Residents

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References:

Abrahamsen, B., van Staa, T., Ariely, R., Olson, M., & Cooper, C. (2009). Excess mortality following hip fracture: A systematic epidemiological review. *Osteoporosis International*, 20, 1633-1650. Hill-Westmoreland, E. E. & Gruber-Baladini, A. L. (2005). Falls documentation in nursing homes: Agreement between the minimum data set and chart abstractions of medical and nursing documentation. *Journal of the American Geriatrics Society*, 53, 268-273. doi:10.1111/j.1532-5415.2005.53113.x

Abstract Summary:

Previous research on falls in older adults is inconsistent and conflicting in both defining and determining risk factors for falls with major injury. The proposed research intends to develop a model for falls with major injury in nursing home residents using a national database of residents assessments.

Learning Activity:

LEARNING OBJECTIVES	EXPANDED CONTENT OUTLINE
The learner will be able to discuss risk factors for falls versus risk factors for falls with major injury in nursing home residents.	Epidemiology of falls in elderly nursing home residents. Comparison of risk factors for falls in general and falls with major injury.
The learner will be able to discuss application of the environmental press theory for research on falls with major injury in nursing home residents.	The environmental press theory as a potential model for a research study.

Abstract Text:

Background: The combination of more elderly living longer¹ and needing more supportive care means the absolute proportion of older adults in nursing homes is likely to rise.² Nursing home residents are more likely to fall as compared to community dwelling older adults.³ Consequently, the absolute number of falls among nursing home residents will also increase with a concurrent rise in falls with major injury⁴: bone fractures, joint dislocations, closed head injuries with altered consciousness, and/or subdural hematoma.⁵ The increased falls with major injury will negatively impact the physical and psychological health of older adults and will expand health care spending.⁶ There is a significant gap in research on falls with major injury among nursing home residents. Previous research is inconsistent and conflicting in defining and determining risk factors for falls with major injury. **Purpose:** The purpose of this study is to identify intrinsic and extrinsic factors from the Long-Term Care Minimum Data Set (MDS) 3.0 for 2014 associated with major injury falls in elderly nursing home residents and use these to develop a parsimonious explanatory model of falls with major injury. **Specific Aims:** The aims of the study are to answer the following questions. In elderly nursing home residents: (Q1) What are the intrinsic and

extrinsic factors that contribute to falls with major injury?; (Q2) Do these factors interact and if so, how do they interact?; (Q3) Which factors and/or interactions of these factors are most useful for explaining who will have a major injury upon falling? **Methods Design:** The study design is an exploratory, retrospective, and secondary analysis of the MDS 3.0 for 2014. The national MDS 3.0 dataset from the Chronic Conditions Data Warehouse contains about 1.4 million beneficiaries. According to Senior Health Informatics Analyst, D. Messenger (written communication, May 2016), each beneficiary carries a maximum 655 variables. **Sample and setting:** The sample is approximately 594,000 through 712,000 Medicare and Medicaid certified nursing home residents in the United States who fell in 2014. Sample size is estimated based on the literature.⁷⁻⁸ Inclusion criteria are (1) age 65 years and over; and (2) had at least one fall in 2014. Exclusion criterion: a movement disorder diagnosis (e.g., Parkinson's disease, multiple sclerosis). **Variables:** Intrinsic factors include: age, gender, race/ethnicity, marital status, vision, hearing, cognitive pattern, mood, behavior, functional status, bladder and bowel continence, diagnoses, pain management, fall history, swallowing and nutritional status, and skin condition. Extrinsic factors include: mobility devices, corrective lenses, hearing aid, medication category, polypharmacy, and length of stay. The outcome or dependent variable is fall with major injury (yes or no). **Analysis:** After data cleaning, at least two subsets will be created by randomly splitting the dataset of eligible beneficiaries. One data set will be used to answer the research questions and the other(s) will be used to test the explanatory model for cross-validation. Q1 will be addressed using descriptive analysis to compare intrinsic/extrinsic factors of beneficiaries with no major injury versus major injury. Next, assumptions for logistic regression and the strength of association between each independent variable and dependent variable (falls with major injury) will be examined. Q2 will be addressed using multiple logistic regression to examine the strength of association between interaction of factors and dependent variable (falls with major injury). Q3 will be addressed using multiple logistic regression to develop a model for falls with major injury by using only statistically and/or clinically significant factors found from simple logistic and multiple logistic regression. The final step in this study will be to test the model on the other dataset created. References 1. Douglas AH, Paul DP. Healthcare rationing and cost control: perspectives on the American health care system. In: *Proceedings of the 2005 Midwest Business Administration Association Conference*; 2005;21-32. 2. Harris-Kojetin L, Sengupta M, Park-Lee E, et al. *Long-term care services in the United States: 2013 overview*. Hyattsville, MD: U.S. Department of Health and Human Services Centers for Disease Control and Prevention, National Center for Health Statistics; 2013. Series 3(7). 3. Baranzini F, Diurni M, Ceccon F, et al. Fall-related injuries in a nursing home setting: is polypharmacy a risk factor? *BMC Health Services Research*. 2009;9(228). doi:10.1186/1472-6963-9-228 4. Van Doorn C, Gruber-Baldini AL, Zimmerman S, et al. Dementia as a risk factor for falls and fall injuries among nursing home residents. *J Am Geriatr Soc*. 2003;51:1213-1218. doi:10.1046/j.1532-5415.2003.51404.x 5. *Long-term care facility resident assessment instrument 3.0 user's manual version 1.13*. Baltimore, MD: Department of Health and Human Services Centers for Medicare & Medicaid Services; 2015. Retrieved from <https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/NursingHomeQualityInits/Downloads/MDS-30-RAI-Manual-V113.pdf> 6. Abrahamsen B, van Staa T, Ariely R, et al. Excess mortality following hip fracture: a systematic epidemiological review. *Osteoporos Int*. 2009;20(10):1633-1650.doi:10.1007/s00198-009-0920-3. 7. *MDS 3.0 frequency report*. Baltimore, MD: Centers for Medicare and Medicaid Services;2012. Retrieved from <https://www.cms.gov/Research-Statistics-Data-and-Systems/Computer-Data-and-Systems/Minimum-Data-Set-3-0-Public-Reports/Minimum-Data-Set-3-0-frequency-report.html> 8. Hill-Westmoreland EE, Gruber-Baladini AL. (2005). Falls documentation in nursing homes: agreement between the minimum data set and chart abstractions of medical and nursing documentation. *J Am Geriatr Soc*. 2005;53(2):268-273. doi:10.1111/j.1532-5415.2005.53113.x