

Nursing Home Registered Nurses' and Licensed Practical Nurses' Knowledge of Causes of Falls

Rutgers University has made this article freely available. Please share how this access benefits you.
Your story matters. [\[https://rucore.libraries.rutgers.edu/rutgers-lib/47857/story/\]](https://rucore.libraries.rutgers.edu/rutgers-lib/47857/story/)

This work is an **ACCEPTED MANUSCRIPT (AM)**

This is the author's manuscript for a work that has been accepted for publication. Changes resulting from the publishing process, such as copyediting, final layout, and pagination, may not be reflected in this document. The publisher takes permanent responsibility for the work. Content and layout follow publisher's submission requirements.

Citation for this version and the definitive version are shown below.

Citation to Publisher Gray-Miceli, Deanna, de Cordova, Pamela B., Crane, Giles L., Quigley, Patricia & Ratcliffe, Sarah J.
Version: (2015). Nursing Home Registered Nurses' and Licensed Practical Nurses' Knowledge of Causes of Falls. *Journal of Nursing Care Quality* 00(00), 1-8. <https://dx.doi.org/10.1097/NCQ.000000000000157>.

Citation to this Version: Gray-Miceli, Deanna, de Cordova, Pamela B., Crane, Giles L., Quigley, Patricia & Ratcliffe, Sarah J. (2015). Nursing Home Registered Nurses' and Licensed Practical Nurses' Knowledge of Causes of Falls. *Journal of Nursing Care Quality* 00(00), 1-8. Retrieved from [doi:10.7282/T38054HV](https://doi.org/10.7282/T38054HV).

Terms of Use: Copyright for scholarly resources published in RUcore is retained by the copyright holder. By virtue of its appearance in this open access medium, you are free to use this resource, with proper attribution, in educational and other non-commercial settings. Other uses, such as reproduction or republication, may require the permission of the copyright holder.

Article begins on next page

Protecting patients from harm due to falls is a public health priority and the responsibility of the healthcare workforce, especially when delivering care to older adults residing in nursing homes (NHs). Between $\frac{1}{2}$ to $\frac{3}{4}$ of the 1.4 million NH residents fall yearly¹. The patient population residing in NHs possesses multiple chronic illnesses and functional limitations², and frequently incurs recurrent falls, evidenced by a summary of long term care studies which have calculated a mean fall rate of 1.7 falls per person year³. Equally important as preventing falls is protecting patients from associated injury, a leading cause of mortality in the older adult population⁴.

Compared to other populations who fall, patients who fall in NHs result in more serious complications, with 10-25% of falls resulting in fracture injuries and lacerations^{3,5}. Serious injuries reported in the NH include hip and pelvic fractures, found to have an increased mortality⁶⁻⁷, and head injury⁸. The aftermath of an injurious fall for older adults in NHs often includes hospitalization with long lengths of stay, reduced function and mobility, among other adversities⁹. This overall economic burden of the direct and indirect costs for fall care is projected to sky rocket to \$59.6 billion by 2020⁹.

Falls are not a normal or inevitable part of the aging process: rather, falls are considered a preventable geriatric syndrome¹⁰. Patient falls result from the interaction between patient-specific risk factors, the physical environment, and process of care delivery¹¹. The epidemiology of falls in older adults is rooted in personal risk factors of multifactorial origin¹¹⁻¹². Evidence substantiates multifactorial fall risk to include lower extremity muscle weakness, cognitive, visual, gait or balance impairment, orthostatic hypotension¹³⁻¹⁴, and use of high-risk medications¹⁵ as well as footwear¹⁶ and environmental risks external to the person. Because of

the varied multifactorial etiological basis of a fall, not all falls are the same. Prior nursing research has generated a broad nomenclature of causal event factors contributing to falls among older adults in acute and long-term care settings¹⁷⁻¹⁸. In prior research in the NH environment, professional registered nurses (RNs) have diagnosed 8 types of falls among their falling patients, which include falls due to: 1) an acute medical reason; 2) a chronic medical reason; 3) environmental reasons; 4) adverse medication effects; 5) behavioral reasons; 6) poor safety awareness or poor judgment of the patient; 7) unknown reasons; and 8) multifactorial reasons¹⁸. Different types of falls means interventions will differ depending on the type of fall occurring: falls prevention intervention for accidental falls is much different than those due to acute physiological or medical reasons¹⁷⁻¹⁹.

Evidence suggests that approximately 30% of patient falls in NHs are preventable³, however their prevention hinges upon accurate scientific knowledge, the correct assessment and diagnosis by the RN. Few studies have been conducted in NHs to determine nurse's knowledge of underlying causes of falls in older adults and if RNs can decipher from a range of common fall scenarios the likely underlying reason for the fall and corresponding intervention¹⁸, thus creating a gap in our knowledge for falls prevention. The potential influence of the RN on reducing falls in NHs is critically important given the harms associated with fall related injuries. Moreover, according to licensure, nursing scope of practice supports only RNs are to perform the patient assessments to determine underlying causes of a patient fall²⁰. Yet in some NH practice environments, it is commonplace for licensed practical nurses (LPNs) to deliver care interchangeably with RNs²¹. If we are to improve practice and patient outcomes, it is essential to

know more about nurse's knowledge and role in the processes of care for falls and injury prevention.

The outcomes in this study include the RNs knowledge of underlying causative event factors for falling among older adults. Since direct patient care is provided by LPNs as delegated by RNs, we included LPNs in our sample, who are expected to have an understanding of factors associated with patient safety, falls prevention and the multifactorial nature of falls in older adults in NHs. As a result of educational preparation however, we hypothesize LPNs knowledge of fall etiology will be less accurate than RNs.

BACKGROUND

Nurses who care for older patients in the healthcare setting must understand why a fall has occurred before they can intervene with a plan for their prevention, thereby improving the quality of care, and potentially reducing deaths²². Toward this end, NH facility educators provide continuing education to staff nurses in falls prevention. Typically however, facility-based education programs in falls prevention are not directed at RNs only, but rather all licensed personnel collectively. As well, facility-based programs in falls prevention are noted to focus heavily on quality improvement or systems approaches²³. Educational content, and measures to ascertain staff knowledge within these programs is usually limited to general safety precautions and measures to prevent accidental type falls²⁴⁻²⁵. Moreover, learner outcomes related to requisite knowledge attained from these programs are measured by an isolated post-test evaluation. In short, critical gaps exist in the NH practice environment related to overall translation and use of scientific knowledge about falls among older adults in NHs, as well as knowledge sustainability.

Furthermore, while nurses could rely on clinical practice guidelines²⁶ for falls prevention treatment protocol in their plans of care, barriers prevent their implementation in practice. In a study of 1830 practicing nurses, the greatest barriers to the implementation of guidelines were: 1) lack of knowledge, education and motivation of staff; 2) lack of change champions availability of support staff; and 3) lack of access to resource facilities²⁷. With no formal measures to assess nurses' knowledge of underlying causal event factors for falls, a critical gap in falls prevention exists. Understanding the differences between RN and LPN knowledge of falls prevention and care processes warrants further study.

Purpose

The purpose of the study was to determine what are the differences in knowledge among RNs versus LPNs as it relates to the eight multifactorial reasons to fall among older adults residing in the NH?

METHODS

Study Design

A multisite, cross-sectional study was conducted in 2011-2012 with nurses from 3 NHs which utilized a randomized viewing of validated fall clinical vignettes by nurse participants. The order of viewing each vignette 1-8 followed a pre-determined randomization sequence in order to minimize an order effect which might have existed.

Setting

Three licensed NHs volunteered as sites for this study. Each facility provides assisted living and skilled nursing care to older adults in the northeastern region of the United States. All

3 NH sites were similar in size (ranging from 127-144 beds), occupancy rate (ranging from 94-100%), type of services provided and quality facility in terms of care. The three sites encountered similar fall rates: NH site 1-calculated fall rate 3.7 falls/1,000 bed days; NH site 2-calculated fall rate 3.75 falls/1,000 bed days, and NH site 3-calculated fall rate of 4.3 falls/1,000 bed days. Overall, these homes were representative of the falls epidemiology landscape across the country¹. All sites were located in metropolitan settings and provided annual education for staff in falls prevention. University approval to conduct the study was granted by the Institutional Review Board.

Sample

There were 47 nurse (RN = 23, LPN 24) participants who were English speaking, employed full-time, part-time or per-diem, and provided direct hands on care. Excluded were nurses in management roles, such as charge nurses or Director of Nurses.

Measures

Demographic survey

A demographic survey was administered to participants which included the nurses age , gender, ethnicity , educational profile and preparation, years in practice and number of continuing education programs taken in falls prevention at the NH site.

Validated fall clinical vignettes

Because no universal fall knowledge test exists to elicit knowledge of fall causes for use in NHs, we selected 8 validated clinical vignettes of falls as a proxy measure to test RNs and LPNs knowledge and assessment of underlying factors contributing to falls. Clinical vignettes have

been found to effectively teach nurses diagnostic skills²⁸. Each of the 8 falls clinical vignettes were developed from complex case exemplars obtained in prior clinical research by the PI¹⁸ to provide realistic scenarios of the multifactorial etiology of falls. Two national falls prevention experts analyzed the content of the 8 vignettes to determine their suitability for this study. To be representative of a particular type of fall, each vignette contained various representative nursing assessment findings typical of that particular type of fall. Refinements were made based on experts responses when 80% inter-rater reliability was achieved. Each of the 8 clinical vignettes was then validated again with the PI and one expert educational evaluator, using a rating tool for overall content, flow, ease of reading, consistency and presentation. The final 8 fall clinical vignettes' were refined so that they were phrased alike, appeared consistent and were of equal length and equivalent content. These vignettes were designed to elicit the nurses assessment of various types of falls.

Procedures for Data Collection

Research assistants recruited nurses from 3 NH sites. Packets were assembled to contained: 1) a 2 page demographic survey; and 2) eight fall clinical vignettes along with a questionnaire about the likely underlying reason for the fall and single best intervention they would institute to reduce the fall from reoccurring. The order in which the vignettes were presented in each package was determined using a randomized block design. Surveys were administered on off-hours to minimize fatigue. The PI blindly reviewed nurses' responses to each case as "correct" or "incorrect", based on the pre-specified correct response for each research question.

Statistical Analysis

Standard descriptive statistics were used to summarize the educational experience (subjectively and objectively) of the nurses in the sample. For each of the 47 nurses in the study, the number and percentage of correct answers on the 8 fall vignettes were calculated. These responses were used to generate a total score of correct answers. We examined whether the percentage of correct answers varied by order of presentation, age, and licensure or degree type of respondents via a multiple generalized linear model; probabilities and 95% confidence limits were computed. Logistic regression was used to test for differences on each of the vignettes separately, since they were designed to test different etiology domains. An analysis of variance was also performed to test the relationship between licensure type (RN or LPN), educational preparation and nursing home type (1, 2 or 3) on test performance. The average category score for RNs versus the average category score for LPNs was also computed using an analysis of variance (ANOVA). Comparisons of category effects were made within nurses and so were made with more precision than between nurse groups. All analyses were conducted in the R statistical package (Developmental Core Team, Vienna, Austria, 2012).

RESULTS

There were 23 RNs (48.9%) and 24 LPN's (52.1%) in the sample. Of the 47 nurses who participated, 26 nurses (56.5%) were from NH site 1, 14 nurses (30.4%) were from NH site 2, and 7 (14.8%) were from NH site 3. RNs had a mean age of 51.3 years, while LPN's were slightly younger at 47 years of age. Most nurses' were female (97.8%; n=46) and of multi-racial origin (53%; n=25). Most nurses' were associate degree prepared (44.6%; n=21) with a median of 10 years licensed to practice (range 2-48 years) and a median of 9 years employed in the NH. Thirty-nine percent of the sample were baccalaureate prepared RNs (n=9).

Over three-quarters of nurses perceived themselves “very knowledgeable” (76%; n=36) “extremely knowledgeable” (17%; n=8) or “somewhat knowledgeable” (6.3%; n=3) in falls prevention, having attended an average of 4 educational programs in the past year. Over forty percent of nurses rated their confidence in falls prevention as very confident (42.6%; n=20) or somewhat confident (46.8%; n=22). No nurse perceived themselves as not knowledgeable or not confident in falls prevention.

Each of the eight fall vignettes were designed to examine a different potential cause of the fall, and were stratified by cause for further analysis, as presented in Table 1. RNs were most accurate in identifying fall events due to underlying chronic factors (91.3% correct) or behavior (78.3% correct), but performed the worst on accidental falls, falls due to poor judgment (21.7% correct) or unsafe equipment (30.4% correct) despite perceived confidence. LPN’s (n=23) were most accurate in identifying fall events due to behavior causes (83.3% correct) or acute medical reasons (75% correct). Overall, RNs performed above LPNs on risk for two types of falls: accidental/environmental and anticipated physiological falls, such as those falls due to chronic medical and medication reasons. However, due to the small sample size, there were no significant relationships on self-reported confidence scores and probabilities of scoring correctly. Additionally, because there was not enough statistical power to compare RNs and LPNs on individual categories, we chose to compare the average category score for RNs versus the average category score for LPNs using an ANOVA test for this determination.

In models adjusted for nursing home type and educational level, there was a statistically significant relationship between licensure (RN versus LPN) and average category scores on the

vignettes with RNs achieving better results than LPNs (F value=4.1062; p=.049). RNs had an estimated 5% higher score than LPNs (95% CI: 0.1-4.4, p=0.049) when average category scores were compared. Other variables were not significantly associated with the scores.

DISCUSSION

Findings from our study indicate substantial changes are needed to properly educate nurses in falls prevention in NHs. Within facility-based continuing education programs in falls prevention, changes should address two broad areas of concern. The first would include improving the educational content addressing the various types of falls, and assessment findings occurring in older adult patients in NHs. The second area of concern is to design content based on nursing scope of practice.

In terms of the educational content provided in the 8 vignettes, current evidenced-based science was used to develop the educational content provided in the 8 fall vignettes. Yet, professional nurses' knowledge of these 8 causative factors for falls was unsatisfactory despite their self-rated beliefs and prior continuing education in falls prevention. Overall, none of the RNs or LPNs answered any of the 8 vignettes 100% correctly. The range of correct responses among all nurses was from 21.7 % to 91.3%. When individual categories were analyzed, RNs, who correctly identified 3 causative factors to fall, did not perform as well as LPNs, who correctly identified 5 causative factors to fall. Because nurses' lacked the knowledge to meet the practice standards in all 8 validated fall clinical vignettes, we conclude the current fall prevention educational programs among these 3 NHs are insufficient and limited. This raises suspicion as to the content of information provided in falls prevention in NHs nationwide. Accurate knowledge and nursing assessment of the multifactorial factors contributing to falls among older adults is a

practice standard for professional nurses so they can appropriately intervene for patients at risk for falls^{10,19,26}. It is especially essential for NH nurses to possess current and accurate scientific knowledge of falls and their prevention as they provide care to older adult patients who possess many complex and multiple chronic illnesses.

Findings from this study illustrate nurse licensure was a contributing factor to the nurses' scores on the fall vignettes. Comparisons of the category effects (averages of RNs and LPNs) for example for falls due to environmental causes versus falls due to acute care medical reasons were made within nurse groups, providing more precision than between nurse groups. Although RNs scored lower than LPNs in some areas as reflected in Table 1, when we computed the average score of all 8 categories of Registered Nurses' versus the average score of all 8 categories of Licensed Practical Nurses', we found RNs scored higher (F value =4.106; $p < 0.05$) in identifying 8 causal reasons to for older adults to fall. These findings confirm our expectations that RNs, who have a stronger knowledge base to assess patients, would perform best.

In terms of nurse engagement in the work environment, it is possible nurses in our study were unsatisfied with their job, and were not engaged in completing the survey, nor completing the clinical vignettes with accuracy, even though evidence suggests NH nurses believe 'reasons for falls' to be an important knowledge factor²⁹. In a sample of 863 RNs work in 282 skilled nursing facilities in New Jersey, researchers found that staff RNs' participation in facility affairs, supportive manager, and resource adequacy were positively associated with RNs' job satisfaction³⁰. It may behoove administrators to engage nurses by using creative measures to increase NH nurses' knowledge of falls prevention. Although NHs provide in-house education

programs to staff and NH nurses obtain continuing education on fall prevention, these sessions may be not be effective if the nurses' are not engaged in their work environment.

Limitations

There are a few limitations of this study. First, there was a lack of empiric indicators to objectively measure the presence or degree of fatigue or stress which may have contributed to test performance, although we controlled for fatigue by randomization of vignettes and held surveys during off-duty hours. Our sample size does not have the power to statistically test relationships. However, the design had 47 participants with 8 responses each which was a large enough sample to detect any substantial effects. Another limitation concerns the use of vignettes. The use of 8 written case vignettes, to test nurses' cognitive knowledge and assessment of underlying causes of falls may not be the best measure to ascertain cognitive knowledge. It is possible other methodological approaches to test cognitive knowledge and assessment might have resulted in a higher percentage of correct responses. For example, testing nurses' knowledge in real-time with actual patients they have assessed (as opposed to reading vignettes) may yield higher percentages of correct responses to questions which sought to determine underlying fall causes, because the nurse can relate to a patient he or she cared for. Another limitation was the small panel of expert judges to validate the 8 clinical vignettes used in this study.

CONCLUSION

Findings from our study illustrate significant knowledge deficits of fall prevention among both RNs and LPNs. Both groups of nurses were unable to correctly distinguish between eight

different underlying causal event factors associated with falls. These findings have implication for practice, education and future research. In terms of practice, nurses are held accountable to the prevailing standard of care. The prevailing standard of care for falls prevention recognizes falls are potentially preventable, depending on their underlying causative factors and clearly departs from the notion that all falls are due to accidents or environmental events external to the person, as once taught. In terms of education, the standard of care for evaluating staff knowledge of falls in NHs rests on administration of falls prevention knowledge tests or post test following continuing education programs. Further work must be directed at developing educational content within falls prevention training programs based on underlying causative event factors contributing to older adult falls, consistent with current fall theory and falls epidemiology. Developing training programs based on evidenced-based content in falls prevention is one step toward ensuring nursing staff are competent to assess patients and provide appropriate care for older adults who fall. Finally, in terms of research, findings from our study warrant follow up study of intermediary explanatory factors with larger samples to determine if what we found in these 3 NHs also occurs in other NHs. It is still unclear the degree to which NH nurses' knowledge in falls prevention translates to actual assessment skills for falls prevention.

Patient safety and quality care for falls and injury prevention are expectations and rights of each and every patient. All nurses working in NHs must possess accurate and current scientific knowledge about the multifactorial etiologies of falls among older adults. It is especially urgent, however for professional RNs to have this knowledge so they can be competent in providing appropriate assessments and diagnoses of their patients which are needed to further direct interventions for falls prevention.

References

1. Centers for Disease Control and Prevention. Falls in nursing homes. 2015. National Center for Injury Prevention and Control (NCIPC). Retrieved from:
<http://www.cdc.gov/HomeandRecreationalSafety/Falls/nursing.html>
2. Harris-Kojetin L, Sengupta M, Park-Lee E, Valverde R. Long-Term Care Services in the United States: 2013 Overview. National health care statistics reports: no. 1. Hyattsville, MD National Center for Health Statistics.
3. Becker C, & Rapp K. Fall prevention in nursing homes. *Clin Geriatr Med* 2010; 26(4):693-704.
4. Center for Disease Control and Prevention. National Center for Injury Control and Prevention. Web- based Injury Statistics Query and Reporting System (WISQARS).
5. Rubenstein LZ. Falls in older people: Epidemiology, risk factors and strategies for prevention. *Age Ageing*. 2006; 35(Suppl 2): 37-41.
6. Rapp K, Becker C, Lamb SE et al. Hip fractures in institutionalized elderly people: Incidence rates and excess mortality. *J Bone Miner Res*. 2008; 23:1835-31.
7. Rapp K, Cameron ID, Kurrie S, et al. Excess mortality after pelvic fractures in institutionalized older people. *Osteoporosis Int*. 2010; 21(11): 1835-9.
8. Authors A. Ambulatory assisted living elderly fallers at greatest risk for head injury. *J Am Geriatr Soc*. 2013;61(10): 1817-1819.
9. National Council on Aging (2012). National Falls Prevention Resource Center.
10. American Geriatrics Society/British Geriatrics Society (AGS/BGS). 2011. Clinical practice guidelines for prevention of falls in older persons. *J Am Geriatr Soc*. 2011; 59: 148-157.

11. Kron M, Loy S, Sturm E, Nikolaus T, Becker C. Risk indicators for falls in institutionalized frail elderly. *Am J Epidemiol.* 2003; 158:645–653.
12. Rubenstein, L.Z., and Josephson, K. Falls and their prevention in elderly people: what does the evidence show? *Med Clin North Am.* 2006; 90(5): 807-824.
13. Authors B. (2012). Orthostatic hypotension in older nursing home residents who fall: are they dizzy? *Clin Nurs Res.* 2012; 2 (1): 64-78.
14. Mukai, S., & Lipzitz, L.A. Orthostatic hypotension. *Clin Geriatr Med* 2002; 18(2): 253-268.
15. Ray, W.A, Thapa, P.B., & Gideon, P. 00). Benzodiazepines and the risk for falls in nursing home residents. *J Am Geriatr Soc.* 2000; 48(6): 682-685.
16. Koepsell, T.D, Wolf, M.E, Buchner, D.M, Kukull, W.A, LaCroix, A.Z, Tencer, A.F, Frankenfield, C.L, Tautvydas M. & Larson, E. Footwear style and risk of falls in older adults. *J Am Geriatr Soc.* 2004; 52(9): 1495-1501.
17. Morse, J. (2008). *Preventing Patient Falls.* Second edition, Springer Publishing Company.
18. Author C. Use of a comprehensive post fall assessment tool for fall prevention in older adults. *West J Nurs Res.* 2010; 32(7): 932-948.
19. Cameron ID, Murray GR, Gillespie LD, et al. 2010. Interventions for preventing falls in older people in nursing care facilities and hospitals. *Cochrane Database Syst Rev* 2010; 1:CD005465.
20. New Jersey Administrative Code 8:39. Standards for licensure of long-term care facilities, p. 78. 2012.
21. Corazzini KN, McConnell ES, Day LD, Anderson RA, Mueller C, Vogelsmeier A, Kennerly S, Walker B, Flanagan JT, and Haske-Palomino. Differentiating scopes

- of practice in nursing homes: Collaborating for care. *J Nurs Regul.* 2015; 6(1): 43-48.
22. Needleman J. Is what's good for the patient good for the hospital? Aligning incentives and the business case for nursing. *Policy Politics Nurse Practice.* 2008; May 9(2): 80-87.
 23. Bonner A. Falling into Place: A practical approach to interdisciplinary education on falls prevention in long term care. *Ann Long term Care.* 2006; 14(6): 21-27.
 24. Hartford Center for Geriatric Nursing Excellence. Fall Prevention for Older Adults Knowledge Assessment Test. In Fall Prevention for Older Adults Evidence-based Guidelines. The Hartford Foundation, Center of Geriatric Nursing Excellence, the University of Iowa, College of Nursing, 2004.
 25. Falls Knowledge Test. In Preventing Falls in Hospitals: A Tool kit for Improving Quality Care. AHRQ Publication No. 13-0015-EF.
 26. National Clinical Practice Guidelines (NCPGs). National Guidelines Clearinghouse (NGC). Guideline Summary: [Preventing falls in acute care. In: Evidenced-based geriatric nursing protocols for best practice]. Rockville (MD).
 27. Koh, S.L., Manias, E., Hutchinson, A.M., Donath, S., & Johnston, L.. Nurses' perceived barriers to the implementation of a fall prevention clinical practice guidelines in Singapore hospitals. *BMC Health Service Research.* 2008; 8(1): 105
 28. Nendaz, M.R., Raetzo, M.A., Junod, A.F., & Vu, N.V. (2000). Teaching diagnostic skills: clinical vignettes or chief complaints? *Advances in Health Science Education Theory and Practice.* 2000; 5(1): 3-10
 29. Harten-Krouwel, D., Schuurmans M., Emmelot-Vnok, M., & Pel-Little, R. Development and feasibility of falls prevention advice. *J Clin Nurs* 2011; 20 (19-20): 2761-2776.

30. Choi J. Flynn L, and Aiken L. Nursing practice environment and registered nurses' job satisfaction in nursing homes. *The Gerontologist*. 2012; 52(4): 484-492.
31. Author D. Current approaches to post-fall assessment in nursing homes. *JAm Med Dir*. 2004; Nov/Dec Issue: 16-24.