Medications and Falls

Addressing the Risk through Pharmacist-Led Quality Initiatives

Bonnie X. Li-MacDonald, BA; Jessica Pyhtila, BA; and Nicole J. Brandt, PharmD, CGP, BCPP, FASCP

ABSTRACT

Falls in older adults are common in the long-term care setting and are associated with functional decline, isolation, and depression. Increased attention is being given by the Centers for Medicare and Medicaid Services to have nursing homes implement quality assurance programs with the aim to reduce falls. Within the nursing home, pharmacists are expected to conduct at least monthly medication reviews and monitor for therapeutic effectiveness as well as adverse consequences of medications. This article discusses pharmacist-led team interventions to reduce fall risk in residents at a continuing care retirement community. One intervention is a fall risk evaluation form that notifies the assisted living care team of modifiable risk factors for residents who fall frequently. Examples include recommendations on discontinuing psychotropic medications that affect gait or alter mental status. In conjunction with the nursing home care team, the pharmacist also created two other programs that aim to (a) improve bone health by identifying residents who have low vitamin D levels and evaluating their need for calcium and vitamin D supplementation, and (b) educate the nursing staff of specific medication side effects that increase fall risk. [*Journal of Gerontological Nursing, 40*(1), 8-12.]

ABOUT THE AUTHORS

Ms. Li-MacDonald and Ms. Pyhtila are PharmD Candidates, University of Maryland School of Pharmacy; and Dr. Brandt is Associate Professor, Geriatric Pharmacotherapy, Pharmacy Practice and Science, University of Maryland School of Pharmacy, and Director, Clinical and Educational Programs of Peter Lamy Center Drug Therapy and Aging, Baltimore, Maryland.

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Address correspondence to Nicole J. Brandt, PharmD, CGP, BCPP, FASCP, Associate Professor, Geriatric Pharmacotherapy, Pharmacy Practice and Science, University of Maryland School of Pharmacy, and Director, Clinical and Educational Programs of Peter Lamy Center Drug Therapy and Aging, 20 North Pine Street N529, Baltimore, MD 21201; e-mail: nbrandt@rx.umaryland.edu.

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Falls are problematic for older adults and are particularly prevalent in the nursing home environment, with between half and three quarters of nursing home residents falling every year, and an average of 2.6 falls per resident per year (Centers for Disease Control and Prevention [CDC], n.d.). Morbidity and mortality resulting from falls in this population is high, with up to 6% of falls resulting in fractures and up to 20% leading to serious injury (CDC, n.d.). Quality of life can also be adversely affected by falls, with an association between falls and functional decline, isolation, and depression (CDC, n.d.). Residents at risk for falls can be identified through both fall risk assessments and analysis of known risk factors, including previous falls, disability, use of walking aids, cluttered living spaces, and potentially inappropriate medication (PIM) use (American Geriatrics Society 2012 Beers Criteria Update Expert Panel [AGS], 2012; CDC, n.d.; Deandrea et al., 2013). In the nursing home population, additional risk factors include issues with muscle weakness and gait, which are responsible for 24% of falls (CDC, n.d.).

The Centers for Medicare and Medicaid Services (CMS) has recently renewed efforts to influence nursing homes to improve clinical outcomes such as falls in older adults. Nursing homes must develop Quality Assurance (QA) and Performance Improvement Plans per CMS regulations under Section 6102(c) of the Affordable Care Act. The rule is currently in the Proposed Rule Stage in the Unified Agenda as of fall 2013 (CMS, n.d.). When a final rule is passed, nursing homes will have 1 year to implement strategies for continuous identification and resolution of quality deficiencies while sustaining performance. Examination of quality improvement processes in fall risk

prevention is already occurring in nursing homes, with employee flexibility, adaptability, and communication considered to be key traits for successful programs (Abrahamson, Davila, Mueller, Inui, & Arling, 2013). Official fall prevention guidelines can provide further assistance to nursing homes regarding strategies for fall risk reduction in older adults (Moyer, 2012; Panel on Prevention of Falls in Older Persons, AGS, & British Geriatrics Society [BGS], 2011).

As previously stated, PIM use is associated with falls (Deandrea et al., 2013). Some medication classes (e.g., psychotropic agents) have been implicated in increasing fall risk in older adults, particularly upon initiation or dose change (Echt, Samelson, Hannan, Dufour, & Berry, 2013). Because of the importance of identifying medications that increase fall risk, many of these medications are included on the AGS Updated Beers Criteria for Potentially Inappropriate Medication Use in Older Adults (AGS, 2012). This list (which can be accessed at http://www.americangeriatrics.org/files/documents/beers/2012BeersCriteria_JAGS.pdf) will soon have a direct effect on the nursing home Five-Star Quality Rating System, which will reflect practitioner involvement in assessing appropriate use of medications that can lead to an increased fall risk. Specifically, the National Committee for Quality Assurance (NCQA), which produces the Healthcare Effectiveness Data and Information Set (HEDIS), will use the Beers Criteria in HEDIS 2014 (NCQA, n.d.).

Medication-related initiatives can have an effect on preventing both falls as well as fall-related morbidity and mortality. For example, supplementation with vitamin D has been shown to decrease both falls and injuries resulting from falls (Annweiler et al., 2010). In addition, tapering and discontinuing medications such as psychotropic agents that affect sleep, depression, and/or anxiety can reduce falls (van der Velde, Stricker, Pols, & van der Cammen, 2007). In a recent randomized controlled trial, 1,314 home-dwelling Finlanders ages 70 or older were randomized into either a 12-month fall prevention program intervention group or a control group. Interventions focused on strength and balance training, medication reviews, adequate intake of calcium and vitamin D, and home hazard assessment and modification. At 12 months, the rate of falls was approximately 30% lower in the intervention group (Palvanen et al., 2013). These national initiatives coupled with concern for resident safety led to a multifaceted pharmacist-led approach to reduce risk factors, namely medication related, that can lead to falls and fractures. This article will highlight these interventions as well as some preliminary findings.

TABLE

MEDICATION EXAMPLES THAT MAY INCREASE FALL RISK

Medication Class	Mechanism for Falls	Drug Examples
ACE inhibitor agents	Hypotension	Benazepril, captopril, enalapril, fosinopril, lisinopril, quinapril, ramipril
Alpha receptor blockers	Hypotension	Doxazosin, prazosin, terazosin
Cardiac agents	Hypotension	Isosorbide dinitrate, isosorbide mononitrate, nitroglycerin, digoxin, atenolol, metoprolol, carvedilol
Anticonvulsant agents	Confusion, dizziness	Carbamazepine, gabapentin, lamotrigine, levetiracetam, phenobarbital, phenytoin, topiramate, valproic acid
Antidepressant agents	Confusion, blurry vision	Amitriptyine, bupropion, citalopram, desipramine, doxepin, escitalopram, fluoxetine, mirtazapine, nortriptyline, paroxetine, sertraline, trazodone, venlafaxine
Antihistamine agents	Confusion, blurry vision	Cetirizine, chlorpheniramine, doxylamine, diphenhydramine, hydroxyzine, meclizine, promethazine
Antipsychotic agents	Rigidity, shuffling gait, slowed movement	Chlorpromazine, clozapine, haloperidol, olanzapine, quetiapine, risperidone
Muscle relaxant agents	Sleepiness, weakness, confusion	Baclofen, carisoprodol, cyclobenzaprine, methocarbamol, tizanidine
Opioid agents	Sleepiness, dizziness, confusion	Butorphanol, codeine, fentanyl, hydrocodone, hydromorphone, meperidine, methadone, morphine, oxycodone, oxymorphone
Benzodiazepine (BZD) and non-BZD sedative hypnotics	Confusion, slowed psychomotor reflexes	Alprazolam, diazepam, lorazepam, midazolam, oxazepam, phenobarbital, temazepam, triazolam, zopiclone, zolpidem
Oral antidiabetic agents	Hypoglycemia, dizziness	Chlorpropramide, glyburide, glimepiride, glipizide
Steroid agents	Weakened bone density	Budesonide, cortisone, dexamethasone, fludrocortisone, fluticasone, prednisolone, prednisone

Adapted from Cadario, B. (2011). BC Falls and Injury Prevention Coalition. Drugs and the risk of falling: Guidance document. *Retrieved from http://www.health.gov.bc.ca/prevention/pdf/medications-and-the-risk-of-falling.pdf.*

QUALITY ASSURANCE INTERVENTIONS

Vitamin D Quality Assurance Initiative

The National Center for Health Statistics reported that up to 7% of men and 11% of women older than 70 are at risk of vitamin D deficiency (Looker et al., 2011). In the nursing home population, more than 40% of residents have a vitamin D deficiency, defined as a vitamin D level < 20 ng/mL (Kojima et al., 2013). A recent study showed that men and women older than 65 with low levels of vitamin D had up to a 40% increased risk for hip fracture compared to those with high vitamin D levels (Holvik et al., 2013). The AGS and BGS guidelines on the prevention of falls recommend adequate calcium and vitamin D supplementation for all older adults, as it is a safe and inexpensive intervention to improve bone health and reduce fracture rates (Panel on Prevention of Falls in Older Persons et al., 2011). This standard of care is assessed on at least a monthly basis as part of the vitamin D QA program conducted by the pharmacist during the federally mandated medication review at the long-term care site. This audit ensures that vitamin D levels are obtained on all new admissions as well as tracked at least annually for all chronic care residents. Furthermore, the monthly reports given during QA meetings provide the medical team with the vitamin D blood levels (baseline and follow-up, if applicable) as well as vitamin D supplementation regimen (if applicable).

The audit has helped optimize both the monitoring as well as utilization of vitamin D supplementation among nursing home residents. Since the implementation of this program in June 2013, there has been an improvement of only 14% of the residents not having any vitamin D monitored compared to 31% at baseline. Furthermore, not only has the use of vitamin D supplementation increased but the attention given to the changes in formulations and dosage during transitions in care has improved. This process has not only improved vitamin D monitoring but identified communication gaps among the various health care systems and providers as well as between the facility and the laboratory services.

Fall Risk Quality Assurance Evaluation Form

A fall risk QA evaluation form was designed to assist the care team with identifying modifiable risk factors for assisted living residents who fall frequently (**Appendix A**, available in the online version of this article). This evaluation is performed in addition to other ongoing pharmacy evaluations, which are conducted every 3 to 6 months. The form consists of listing a resident's medical history, recent vital signs, any elimination issues, use of any assistive device for ambulation, prior care of physical or occupational therapy, current calcium and vitamin D supplements, and any over-the-counter and prescription medications.

The final portion of the form includes medication-related recommendations for the care team, with sections on optimizing bone health, reducing medications that can contribute to falls, and other miscellaneous issues related to increasing fall risk. Upon completion of the form, a consultant pharmacist and student pharmacists will notify the care team to assess patient-specific recommendations. This form provides the care team a snapshot of the multiple factors that can contribute to the fall risk and recommendations to reduce the risk. Overall, there has been a heightened awareness to fall risk factors and person-centered care interventions.

Education In-Service and Training

Ongoing education and training is an essential component to improve care and was another facet to the fall risk reduction program. Nursing staff are at the forefront of direct patient care and often the first to identify medication-related concerns. The interactive aspect of the in-service focused on how direct care staff can recognize any side effects of medications and how they could contribute to falls. For example, antipsychotic medications are known to cause tremors or shuffling, which may increase the risk of falls in residents. A handout was given, in addition to the presentation, that lists specific medications and adverse side effects that could lead to falls (**Table**). Instructions were provided to nursing staff that instead of viewing new tremors or other conditions as requiring additional medication, they should first look to the existing medication regimen as a potential cause for the falls.

The in-service also focused on warning about medications that could worsen a patient's condition after a fall, such as using anticoagulant agents that may lead to higher bleed risk. Additionally, this educational program not only addressed potential adverse consequences but also how to optimize bone health. A short discussion centered on pharmacological approaches (e.g., bisphosphonate agents) as well as diet and exercise.

IMPLICATIONS FOR GERONTOLOGICAL NURSES

An interdisciplinary approach involving close cooperation between nurses, physical therapists, and pharmacists will help reduce the many causes of falls in older adults, among other conditions. These interventions help show the role pharmacists can play in complementing nurses' and physical therapists' unique knowledge and skill set derived from daily bedside interaction with patients.

It is common for nursing home residents to be taking multiple medications and go through transitions of care, which may make it difficult for nurses who directly interact with patients to discern whether a new issue is in fact medication related. With the help of a pharmacist, nurses can stay up-to-date on drug side effects, interactions, and monitoring parameters. In addition to the responsibilities of monthly medication reviews in the nursing home, the pharmacist can be a valuable resource for drug knowledge and program development. Each member of the care team has specialized knowledge and skills, which together can provide consistent and safe patient care.

CONCLUSION

QA and educational programming on the subject of fall prevention is important across all settings of care. Although the number of fall incidents in a facility may be unknown, beginning education on QA and educational programming for both the residents and staff is a critical first step. This not only will help the facility meet future CMS requirements, but also more importantly, improve the quality of care and life for older adults in protecting them from falls and fractures.

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Appendix A

Falls Risk Evaluation Form

QA Falls Risk Reduction Pharmacy Evaluation

The intent of this evaluation is to assist the care team with identifying possibly modifiable risk factors to assist with falls reduction in residents who are frequently falling. This is in addition to the current ongoing pharmacy evaluations, which are conducted every 3-6 months in the assisted living facility.

Resident Information

<table>
<tr><td>Name:</td><td>DOB/Age:</td><td>M F</td><td>Room #:</td></tr>
<tr><td colspan="4">PMH:</td></tr>
<tr><td>What are the dates of falls over the last quarter?</td><td colspan="2">Any injuries? If so specify:</td><td>Any modifications made?</td></tr>
<tr><td colspan="2">BP (ranges):</td><td colspan="2">Pulse:</td></tr>
<tr><td>Allergies: PCN</td><td colspan="2">Weight:</td><td>BUN/SCr: SCr:
CrCl:</td></tr>
<tr><td rowspan="2">Does the resident currently experience elimination issues?
Yes
No
Describe: _____</td><td colspan="3">Does the resident have a balance or gait disorder?
Yes Describe: _____ No</td></tr>
<tr><td colspan="3">Does the resident use an assistive device?
Yes What kind? _____
No</td></tr>
<tr><td>Is the resident under the care of physical and/or occupational therapy?
Yes
No
If no, have they been in the last year and if so when?</td><td colspan="3">Does the resident have vision issues? If so, specify medical etiology and assistive devices?
Yes: Etiology: _____
Glasses: _____
No</td></tr>
</table>

Medication Review

Is the resident currently taking: Calcium: Total Daily Dose_____ Level: _____ Dietary Intake: _____ Vitamin D: Total Daily Dose: _____ Level: _____	Other Bone Active Medication(s): Name: _____ Dose: _____ Duration: _____
What is the total number of medications the resident is taking: Prescription: _____ OTC: _____	Could any of these medications be contributing to falls? Yes No (Additional recommendations are below)
Drugs which may increase resident's fall risk:	

Medication Related Recommendations:

After reviewing the resident's medications the following medication related recommendations were identified:

☐ **Optimize Bone Health by:**

☐ **Reduce Medications that May Contribute to Falls by:**

☐ **Additional Recommendations:**

Evaluation Conducted by: _____ Date: _____

Reviewed by AL Nurse Manager and Care Team: _____ Date: _____