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# Retrospective Analysis on the Incidence of Falls in patients taking medications associated with fall risk

Ansue Koshy, Pharm.D. Candidate 2017, Ridha Hassoun, Pharm.D. Candidate 2018,
Marina Barsoum, Pharm.D. Candidate 2018, Nicole M. Maisch, Pharm.D., Maha Saad, Pharm.D. BCPS CGP
St. John's University College of Pharmacy and Health Sciences, Queens, NY

## Introduction

- Falls are a significant public health problem, especially among the elderly. Falls are not only associated with morbidity and mortality in patients but can lead to a decrease in independence and early admission to long-term care facilities. Effective fall prevention can reduce injuries, emergency room visits, hospitalizations, and functional decline. Therefore, preventing and reducing the risk of falls is important.[1]
- There are numerous risk factors associated with falls, including age, comorbidities and medications. Medications are a modifiable risk factor that pharmacists can play a role in addressing, both in inpatient and community settings.
- Beer's Criteria is a standard reference used widely to define the medications that have a high risk association for falls, delusion, and even death.[2] It lists high-risk medications that should be avoided in patients 65 and older, and gives recommendations on dose adjustments, if the medication must be used.
- The guidelines for prevention of falls in older patients note that psychotropic medications and polypharmacy are factors strongly associated with fall risk .[1] However, there are many other classes such as anti-hypertensives and diuretics that have been shown to cause increased falls.[3]

## Objectives

- To determine whether there is an association between the medication(s) a patient is taking and the occurrence of falls in that patient
- To identify specific drug classes that resulted in the highest rate of falls in admitted patients
- To analyze the time between the administration of a medication and the reported fall

## Methods

**Literature Research**

- After consultation of the 2015 Beer's Criteria along with a thorough literature search, a list of high "fall risk" medications was compiled. This list was then divided into its respective drug classes, which totaled 9 drug classes.

**Inclusion and Exclusion Criteria**

- Adult patients were included if they were admitted to Long Island Jewish Medical Center from January to December 2015, experienced one or more reported falls during admission, and were given a medication known to be associated with falls.
- Patients who were under the age of 18, experienced a fall in the emergency department or outpatient clinic, or were not given a medication from the compiled list were excluded from the chart review.

**Chart Review**

- The patients' ages, comorbidities, medication therapy regimens, documentation of fall assessment and reported falls were analyzed from patient electronic medical records.
- Assessment of therapy based on patient comorbidities and age was performed to determine whether medications administered during their inpatient stay contributed to their risk of falls.
- During review of patient charts, medications that were given within a 48-hours of the reported fall event were stratified, and the duration between medication administration and fall events were recorded.

## Results

### Demographics and Age Stratifications (n = 150)

**Table 1: Demographics**

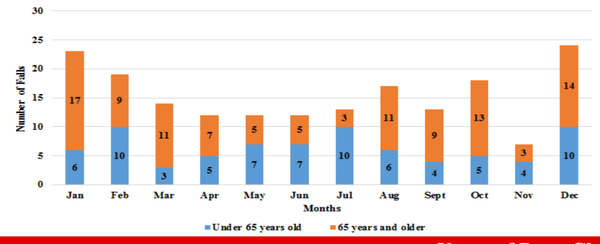
| | |
|---|---|
| **Age** | 67 ± 16 years |
| **Gender (%)** | |
| **Male** | 73 (49%) |
| **Female** | 77 (51%) |
| **Fall Risk Assessed and Documented (%)** | 149 (99%) patients |
| **Fall Risk Present (%)** | 141 (95%) patients |
| **Surface patient fell on** | |
| **Dry** | 135 (90%) |
| **Wet** | 11 (7%) |
| **Diagnostic Imaging (CT, X-Ray, etc) performed after fall** | 62 (41%) |
| **Mean number of drugs contributing to fall** | 2.2 ± 1.6 |

**Table 2: Age Stratification**

| Age | Total patients |
|---|---|
| **<65** | 61 (41%) |
| **≥65** | 89 (59%) |
| **≥ 80** | 33 (22%) |
| **≥ 90** | 8 (5%) |

### Number of Falls Per Month

**Figure 1**




### Drug Usage by Age and Class (n=150)

**Table 3**

| | <65 | ≥65 |
|---|---|---|
| **Narcotics** | 23 (15%) | 25 (17%) |
| **Sedatives/ Hypnotics** | 1 (0.7%) | 3 (2%) |
| **Antidepressants** | 6 (4%) | 16 (11%) |
| **Neuroleptics/ Antipsychotics** | 7 (5%) | 14 (9%) |
| **Anti-hypertensives** | 30 (20%) | 54 (36%) |
| **Benzodiazepines** | 10 (7%) | 11 (7%) |
| **Anticoagulants** | 17 (11%) | 40 (27%) |
| **Antiplatelets** | 1 (0.7%) | 7 (5%) |

### Usage of Drug Classes

**Figure 2: Usage of Drug Classes with Fall Risk**

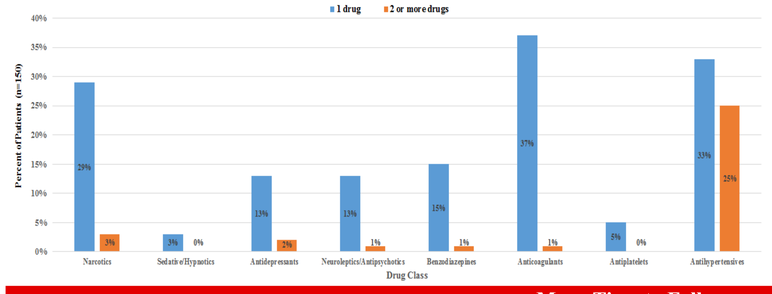
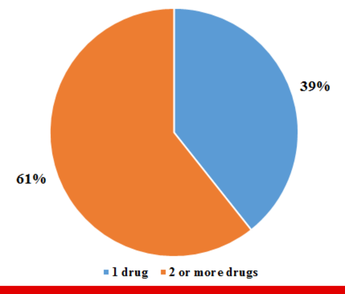
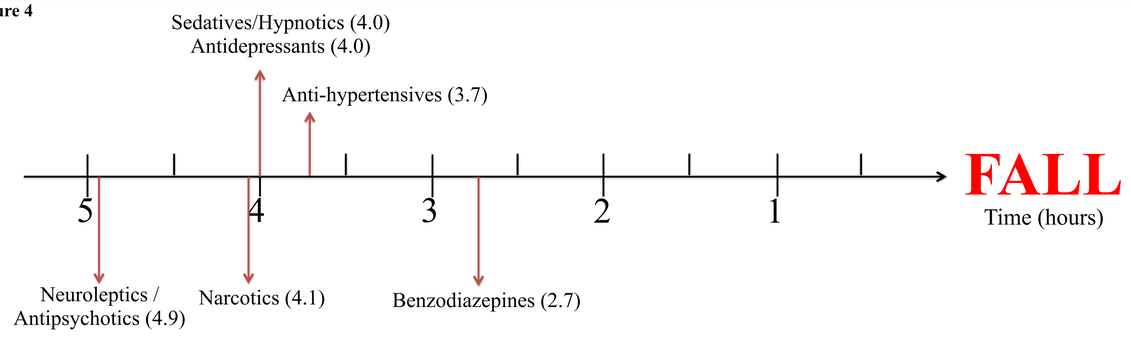



**Figure 3:Overall Usage of Drugs with Fall Risk**




### Mean Time to Fall

**Figure 4**




## Results

Two hundred and thirty-six patient charts were reviewed, and while 184 patients had reported falls within their admission, 150 of those patients met the inclusion criteria of receiving a medication found on the compiled list. The majority of patients only had one fall during their admission (99 percent), while two patients (1 percent) had two falls. Stratification of drug classes by age was performed in order to see whether patients classified as elderly were being administered medications with a fall risk. The most number of falls occurred in the months of January and December with majority of falls reported in patients over the age of 65. Upon analysis of the results, it was found that anti-hypertensives (with the inclusion of diuretics), narcotics, and anticoagulants were the three drug classes most used in this patient population. This result is consistent with the age stratification. In addition, the mean time to fall was also explored. In the 48-hour time span, the time of administration and the time of the reported fall was noted. It was found that anti-hypertensives and narcotics were administered around 4 hours before the reported fall which is relative to their peak effect and duration of actions.

## Conclusion

Following analysis of the reported falls in one year of admissions, it can be said that anti-hypertensives and narcotics caused the most number of falls. While anticoagulants were one of the most administered drug classes in this patient population, anticoagulants are known to increase the risk of harm after a fall rather than being the cause of a fall. Although administration route and patient comorbidities influence onset of action, certain drug classes are attributed to increased fall-risk shortly after administration of a class medication. This study reflects the increasing need for a more rigorous inpatient fall risk assessment involving and careful consideration of patients taking medications known to cause falls within this assessment. Limitations of this study include a lack of analysis of external causes of the fall including disease or environmental, along with the inclusion of certain drug classes such as anti-hyperlycemics . Long-term studies analyzing drug interactions, patient adherence, and medication reconciliations will provide further insight into fall prevention during admissions.

## References

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2. American Geriatrics Society 2012 Beers Criteria Update Expert Panel. American Geriatrics Society updated Beers Criteria for potentially inappropriate medication use in older adults. *J Am Geriatr Soc*. 2012; 60(4):616-31.
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## Disclosures

Authors of this presentation have the following to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation.

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