Comparisons of Fall Prevention Activities Using Electronic Nursing Records: A Case-Control Study

Hyesil Jung, PhD, RN,* Hyeoun-Ae Park, PhD, RN, FAAN, FACMI,† and Ho-Young Lee, MD, PhD*‡

Objective: The aim of this study was to compare the current fall prevention nursing practices with the evidence-based practices recommended in clinical practice guidelines according to the risk of falling and specific risk factors.

Methods: The standardized nursing statements of 12,277 patients were extracted from electronic nursing records and classified into groups according to the risk of falling and individual patients' specific risk factors. The mean frequencies of the fall prevention practices in 10 categories derived from clinical practice guidelines were compared among the groups. We additionally analyzed the differences in the mean frequencies of tailored fall prevention practices according to individual patients' specific risk factors.

Results: The nurses documented more fall prevention practices for patients at a high risk of falling and nonfallers than for patients at a low risk of falling and fallers. Specifically, the difference in nursing practices related to environmental modifications was largest between patients at a high risk of falling and those at a low risk of falling. There were also large differences in the nursing practices related to mental status, dizziness/vertigo, and mobility limitations between fallers and nonfallers. There was more documentation of tailored fall prevention practices related to mobility limitations for patient with mild lower limb weakness than for those with good power and balance. In contrast, patients with severe lower limb weakness had received fewer fall prevention practices related to mobility limitations.

Conclusions: The present findings emphasize that individual risk-specific nursing interventions in addition to universal precautions are crucial for preventing falls among patients.

Key Words: accidental fall, evidence-based practice, fall prevention, tailored nursing practice

(*J Patient Saf* 2022;18: 145–151)

F alls are the most commonly reported patient safety incidents in hospitals. Hospitals find it difficult to prevent falls due to the complex interactions between risk factors and the occurrence of falls. Interventions for fall prevention include universal fall precautions that apply to all patients regardless of the risk of falling and targeted risk-specific interventions.[1] Previous studies have

From the *Office of eHealth Research and Business, Seoul National University Bundang Hospital, Seongnam; †College of Nursing, Seoul National University, Seoul; and ‡Department of Nuclear Medicine, Seoul National University Bundang Hospital, Seongnam, Republic of Korea.
Correspondence: Hyeoun-Ae Park, PhD, RN, FAAN, FACMI, College of Nursing, Seoul National University, Daehak-ro 103, Jongno-gu, Seoul 03080, Republic of Korea (e-mail: hapark@snu.ac.kr).
The authors disclose no conflict of interest.

shown that multifactorial and individualized interventions based on the patient's risk factors were more likely to reduce falls than universal fall precautions.[1–6] However, fall prevention programs traditionally involve the implementation of a standard set of interventions for all patients and rely on nursing staff to select the interventions they feel would best address a patient's fall risk.[7]

Government agencies such as the U.S. Agency for Healthcare Research and Quality (AHRQ), the UK National Institute for Health and Care Excellence, and the Australian Commission on Safety and Quality in Healthcare (ACSQHC) have developed clinical practice guidelines (CPGs) to promote evidence-based practices for fall prevention. These guidelines recommend that fall prevention be applied to patients at a high risk of falling according to their individual risk factors. However, implementing these guidelines in clinical settings is challenging because of environmental factors, such as time constraints, skill mix, workload, and patient acuity.[8] In addition, few studies have implemented evidence-based fall prevention interventions to mitigate patient-specific risk of falling in hospitals.[2,9]

Even in cases where nurses have performed evidence-based fall prevention strategies, the nursing activities were rarely documented in detail,[10] which makes it difficult to retrospectively identify what types of fall interventions were delivered to patients. To our knowledge, no previous study has analyzed the variations in fall prevention interventions according to the risk of falling and individual patients' risk factors using nursing records.

Although no existing studies have used nursing records to look specifically at fall prevention interventions, some extant studies have analyzed the variations in nursing practices for preventing adverse events such as pressure ulcers and surgical site infections. Cho et al[11] found variations in prevention care for pressure ulcers among 427 intensive care patients using narrative nursing notes. Gillespie et al[12] showed that postoperative wound care practices were not consistent with evidence-based guidelines using electronic medical records and hard copy charts of 152 patients in a single hospital. In 2020, Gillespie et al[8] extended earlier research to 2 hospitals and showed variations in wound care practices using electronic medical records and observation methods.

Even if clinical documentation might not accurately reflect the practices of healthcare practitioners in real clinical environments,[12] nursing notes are the only available data source that can be used to explore and analyze nursing activities and clinical problems that cannot be detected by other sources.

The purpose of this study was to compare current nursing practices with evidence-based fall prevention guidelines using electronic nursing record data. We analyzed differences in nursing practices for fall prevention by the risk of falling and individual patients' specific risk factors.

The following specific research questions were addressed by this study. First, do documented nursing interventions for preventing falls differ between patients with high and low risks of falling? If there are differences, do the differences exist even after adjusting for variables that may affect nursing activities, such as the patient age, comorbidities, and patient acuity? Second, do documented nursing interventions for fall prevention differ between fallers and nonfallers? Third, do documented fall prevention
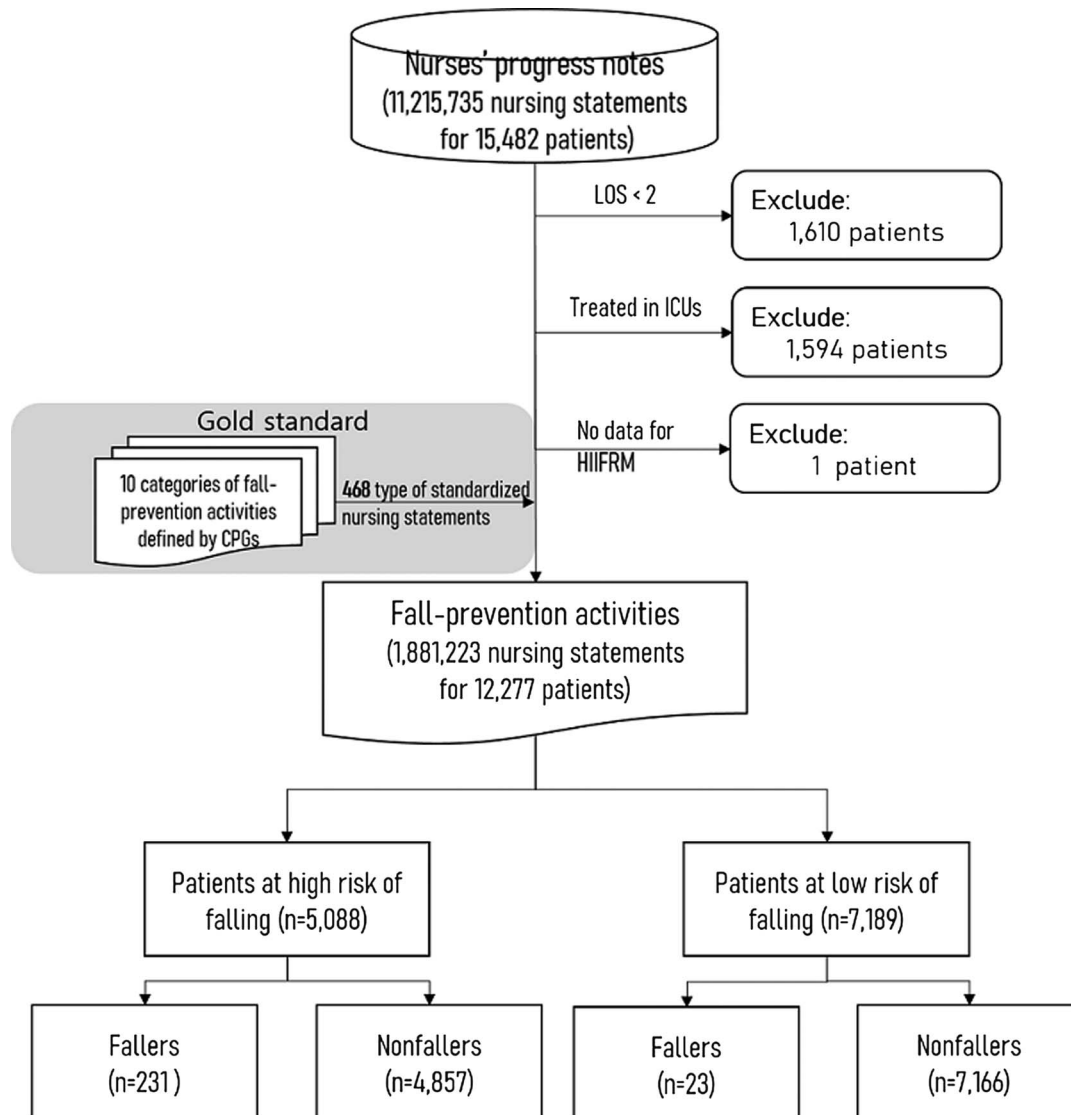
FIGURE 1. Flow chart of subject selection.

interventions applied to patients at a high risk of falling depend on the presence or absence of their risk factors?

MATERIALS AND METHODS

Study Subjects

The selection process for the study subjects is shown in Figure 1. Structured and standardized nursing statements were available for 15,482 patients older than 18 years who were admitted to the neurology, neurosurgery, hematology, and oncology wards of a single tertiary acute care hospital in South Korea from January 1, 2015, to May 31, 2016. The records of 1610 patients who stayed in wards for less than 2 days and those of 1594 patients who were treated in intensive care units were excluded. In addition, the records of 1 patient without the Hendrich II Fall Risk Model (HIIFRM) total score during the study period were excluded. Therefore, we analyzed 1,881,223 standardized nursing statements mapped to fall prevention activities identified from CPGs of 12,277 enrolled patients and classified the patients into 2 groups: patients at a high risk of

falling and patients at a low risk of falling. Each of these 2 groups was then divided into 2 subgroups according to the occurrence of falls: nonfallers and fallers.

Patients at a high risk of falling were defined as those with a HIIFRM total score of 5 points or greater at least once during their hospital stay. The remaining patients were considered to have a low risk of falling. For fallers, we only considered their length of hospital stay from admission to when they first experienced a falling event.

Fallers were defined as patients who were recorded as "fall patients" in the adverse event reporting system or patients with standardized nursing statements describing the occurrence of falls.[13]

Data Sources and Variables

The data sources used for this study were nurses' progress notes, fall risk assessment sheets, initial nursing assessment sheets, doctors' progress notes, and patient acuity assessment sheets. We used fall risk assessment sheets to extract the HIIFRM total scores, scores for each item, and documentation times. The occurrence

and times of falling were identified from the adverse event (fall) reporting system and nurses' progress notes.

In addition, patient sex, age, comorbidities, and patient acuity scores—which could affect nursing activities for preventing falls—were extracted from initial nursing assessment sheets, doctors' progress notes, and patient acuity assessment sheets. Nursing practices for preventing falls were extracted from nurses' progress notes in the form of structured standardized statements. We defined standardized nursing statements on evidence-based nursing practices for fall prevention using 3 CPGs and extracted the statements and their recorded times from the nurses' progress notes.

We used the 2013 AHRQ guidelines,[14] 2009 ACSQHC guidelines,[15] and 2009 Korean Hospital Nurses Association guidelines[16] as the gold standards when extracting nursing practices for fall prevention. We classified the practices into the following 10 categories dizziness/vertigo, medications, patient or caregiver education, altered elimination, environmental modifications, foot problems, confusion or disorientation, use of restraints, vision disturbance, and mobility limitations. These categories were defined as the domains included in each guideline.

We compared the evidence-based nursing practices described in the CPGs with the nursing practices documented using standardized nursing statements. For example, the CPGs recommend that nurses regularly evaluate the extents of balance and muscle weaknesses in patients. Nurses in the study hospital who evaluated the motor power of extremities documented their activities using standardized nursing statements such as "assess motor power of extremities." However, although the CPGs recommend using electronic fall warning devices and avoiding exposure to high temperatures that cause peripheral vasodilation in patients with dizziness to prevent fall accidents, there were no standardized nursing statements relevant to these activities. Of the nursing activities for fall prevention recommended by CPGs, nursing interventions provided to patients in the study hospital were analyzed in this study.

There was almost perfect agreement (98.9%) between the first author and one of the informatics nurses in the process of mapping evidence-based nursing practices in guidelines to standardized nursing statements. Table 1 lists the standardized nursing statements and their codes that reflect nursing activities related to environmental modifications.

Tailored fall prevention practices were defined as those that were customized to specific risk factors (confusion/disorientation/impulsivity, altered elimination, dizziness/vertigo, any administered antiepileptics, any administered benzodiazepines, and Get-Up-and-Go test) that make up the HIIFRM.

Data Analysis

The demographic data of the study subjects were analyzed using descriptive statistics. The mean frequency of fall prevention practices per day (a dependent variable) was computed as the number of aggregated nursing statements according to categories divided by the length of stay for each patient ($\frac{\sum \text{nursing statement by categories}}{\text{length of stay}}$). The mean frequency of tailored fall prevention practices per day was computed as the number of aggregated nursing statements according to risk factors within the HIIFRM divided by the length of stay for each patient ($\frac{\sum \text{nursing statements by risk factors}}{\text{length of stay}}$).

We used the *t* test and linear regression to identify differences in the mean frequencies of documented fall prevention practices between patients at high and low risks of falling before and after adjusting for confounders, such as sex, age, and comorbidities. The *t* test was also used to detect differences in the mean frequencies of documented fall prevention practices between fallers and nonfallers according to the risk of falling, as well as in the mean frequencies of documented fall prevention practices according to specific risk factors for patients at a high risk of falling.

The data were analyzed using R software (version 3.6.3; R Foundation for Statistical Computing, Vienna, Austria).

This study received approval from Seoul National University Bundang Hospital Institutional Review Board and performed in accordance with the relevant guidelines and regulations of the Seoul National University Bundang Hospital Institutional Review Board.

RESULTS

Characteristics of the Study Subjects

The characteristics of the patients in the groups with high and low risks of falling are presented in Table 2. The sex, age, patient acuity score, length of hospital stay, and number of comorbidities differed significantly between the 2 groups. More than 55% of the patients at a high risk of falling were between 60 and 79 years, whereas a large proportion of those at a low risk of falling were between 40 and 59 years. The largest proportion of the patients at a high risk of falling had an acuity score of level 4, whereas most patients (95.59%) at a low risk of falling had an acuity score of level 2 or 3.

Differences in Fall Prevention Practices According to the Risk of Falling Among the Patients

Table 3 presents differences in the fall prevention practices between the patients at high and low risks of falling. Nurses documented more than twice as many fall prevention practices for

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TABLE 1. Standardized Nursing Statements Documenting Environmental Modifications

Code(s) of the Nursing Statement	Nursing Statement
10000010938	Place hospital bed in low position when patient is resting
10000315	Check that the bed is in the locked position
1246, 1675, 4388, 5077	Use bedrails*
10000005178	Place a call light within reach of the patient
10000011826	Keep floor surface clean and dry in the toilet
10000370	Identify high-risk patients using fall risk alert cards above beds
10000369	Offer appropriate toileting aids (urinal) within reach of the patient
10000320	Provide nursing intervention for fall prevention
4875	Provide a safe environment for the patient
4876	Maintain a safe environment for the patient
10000368	Use a nonslip mat on the floor

*Multiple codes indicate that there are multiple nursing statements with the same meaning.

TABLE 2. Comparisons of the Patient Characteristics Between Those at High and Low Risks of Falling

Characteristic	High Risk of Falling (n = 5088)	Low Risk of Falling (n = 7189)	χ^2 or t	P
Sex			10.36	<0.05
Male	2913 (57.25%)	3904 (54.31%)		
Female	2175 (42.75%)	3285 (45.69%)		
Age group, y			1085.2	<0.001
<40	331 (6.51%)	984 (13.69%)		
40–59	1300 (25.55%)	3121 (43.41%)		
60–79	2808 (55.19%)	2948 (41.01%)		
>79	649 (12.75%)	136 (1.89%)		
Occurrence of falls			259.81	<0.001
Faller	231 (4.54%)	23 (0.32%)		
Nonfaller	4857 (95.46%)	7166 (99.68%)		
Patient acuity level			3204.4	<0.001
Level 1	2 (0.04%)	20 (0.28%)		
Level 2	1044 (20.52%)	4116 (57.25%)		
Level 3	1846 (36.28%)	2756 (38.34%)		
Level 4	2196 (43.16%)	297 (4.13%)		
Length of hospital stay, d	11.640	7.458	24.063	<0.001
No. of comorbidities	1.681	1.273	29.023	<0.001

patients at a high risk of falling (14.189) than for those at a low risk of falling (6.390). In particular, the difference was greatest for the environmental modification category ($t = 79.472$). In contrast, nursing practices related to the medications category were documented more for patients at a low risk of falling than for those at a high risk of falling.

After adjusting for sex, age, patient acuity score, length of hospital stay, and number of comorbidities, significant differences between the risk of falling persisted in most categories. Overall, the nurses documented 6.143 more nursing practice statements for patients at a high risk of falling than for those at a low risk of falling, which included 1.922 more statements about environmental modifications and 1.826 more statements about confusion or disorientation. Appendix 1, http://links.lww.com/JPS/A443, lists the differences in the mean frequencies of fall prevention practices according to the risk of falling after adjusting for patient characteristics.

Differences in Fall Prevention Practices Between Fallers and Nonfallers

Table 4 presents variations in the fall prevention practices between fallers and nonfallers at a high risk of falling. Nurses recorded an average of 12.109 and 14.288 fall prevention practices until the occurrence of falls among fallers and until nonfallers were discharged, respectively. In particular, nursing practices about dizziness/vertigo, confusion or disorientation, and mobility limitations were documented more for nonfallers than fallers. However, there was no difference ($t = -0.676$, $P = 0.506$) in the number of preventive nursing practices between fallers (5.747) and nonfallers (6.392) among patients at a low risk of falling.

Differences in Fall Prevention Practices According to the Specific Risk Factors

As indicated in Table 5, patients experiencing confusion or disorientation, altered elimination, dizziness/vertigo, and medications such as antiepileptics and benzodiazepines received more fall prevention practices than did patients without risk factors at a high risk of falling. Nurses documented more nursing practices for patients with mild weakness (pushes up, successful in one attempt) in the lower limbs (2.545) than for those with good power and balance (2.206). In contrast, patients with worse muscle power and balance of the lower

TABLE 3. Differences in the Mean Frequencies of Fall Prevention Practices According to the Risk of Falling

Category	High Risk of Falling (n = 5088)	Low Risk of Falling (n = 7189)	t	P
Dizziness/vertigo	1.602	0.882	33.003	<0.001
Medications	0.042	0.062	−4.832	<0.001
Patient or caregiver education	2.476	1.742	45.615	<0.001
Altered elimination	0.473	0.335	10.619	<0.001
Environmental modifications	2.935	1.036	79.472	<0.001
Foot problems	0.003	0.002	1.343	0.179
Confusion or disorientation	4.459	1.610	51.575	<0.001
Use of restraints	0.083	0.000	11.609	<0.001
Vision disturbance	0.229	0.080	12.907	<0.001
Mobility limitations	1.887	0.642	49.520	<0.001
Total fall prevention practices	14.189	6.390	65.768	<0.001

TABLE 4. Differences in the Mean Frequencies of Fall Prevention Practices According to the Occurrence of Falls in High-Risk Patients

Category	Fallers (n = 231)	Nonfallers (n = 4857)	t	P
Dizziness/vertigo	1.218	1.620	−5.237	<0.001
Medications	0.054	0.041	0.808	0.420
Patient or caregiver education	2.409	2.479	−0.956	0.340
Altered elimination	0.653	0.465	3.217	0.001
Environmental modifications	2.757	2.943	−1.529	0.128
Foot problems	0.004	0.003	0.192	0.848
Confusion or disorientation	3.326	4.513	−5.305	<0.001
Use of restraints	0.087	0.083	0.128	0.898
Vision disturbance	0.207	0.230	−0.493	0.622
Mobility limitations	1.396	1.910	−4.481	<0.001
Total fall prevention	12.109	14.288	−4.183	<0.001

limbs had received fewer fall prevention practices related to motor power.

DISCUSSION

To our knowledge, no previous study has analyzed the patterns and variations in nursing practices for fall prevention according to the risk of falling, between fallers and nonfallers, and according to the individual patients' risk factors. The present study was possible because standardized nursing statements are coded and retrievable from the clinical data warehouse in the study hospital.

Several fall prevention activities recommended in CPGs could not be applied to the study hospital because of differences in healthcare delivery systems and inconsistent findings on the effectiveness of nursing interventions. For example, the AHRQ and ACSQHC CPGs recommend that nurses move patients with cognitive deficits closer to the nursing stations. However, as bed assignments are affected by patient preferences, hospital bed capacity, and cost in Korea, medical staff cannot always move patients near nursing stations, even if this is deemed desirable based on the patient's condition. Meanwhile, the ACSQHC CPG recommends that nurses minimize the use of bedrails. In contrast, a systematic review[17] identified that using bedrails did not increase the likelihood of falls and injuries; therefore, the effectiveness of bedrails in fall prevention remains controversial. Nurses in the study hospital encourage the use of bedrails as the most representative activity for preventing falls from beds.

Regarding nursing activities for fall prevention according to the risk of falling, it was found that nurses documented more activities relevant to fall prevention in their progress notes of patients at a high risk of falling than in those at a low risk of falling. If we assume that the nursing documentation reflects nurses' behaviors, then nurses provided more fall prevention care to patients at a high risk of falling than to those at a low risk of falling. In particular, fall prevention interventions on those related to environmental modifications, confusion or disorientation, mobility limitations, and patient or caregiver education, were provided more to patients at a high risk of falling than to those at a low risk of falling.

Environmental modifications are universal fall precautions that need to provide to all patients across different hospital settings as the basis for patient safety.[14] The AHRQ CPG recommends performing hourly rounds to ensure that universal fall precautions are implemented. However, we found that preventive interventions relevant to environmental modifications were documented for both high- and low-risk groups much less frequently (1.036–2.935 per day) than the recommendations in the CPG. This might be due to nurses routinely implementing environmentally modified activities without documenting them. However, it is impossible to accurately investigate the quantity and quality of nursing activities if they were not documented in nurses' progress notes.[11]

Extant studies have already identified deficiencies in the practice of documentation among nurses worldwide.[18–21] They have reported that nursing records are often incomplete,[19,20] lacked accuracy, and had poor quality.[21] As the study hospital has implemented an electronic nursing records system based on standardized and structured nursing statements mapping to standard terminology, International Classification for Nursing Practice since 2013, it is expected that completeness and quality of nursing records would be better compared to other hospitals. Nevertheless, future studies are needed to observe fall prevention activities nurses provide in clinical practice using a time and motion study, and to compare them with nursing documentation.

Although having a mental status of confusion or disorientation has been considered a major factor affecting the occurrence of falls, there is no robust evidence to support nurses implementing practices that prevent patients with an impaired cognitive status from falling.[22] However, CPGs and study hospitals recommend that nurses assess patients for the presence of delirium regularly and provide orientation repeatedly to prevent falls. In practice, nurses were examining the mental status of the patients at a high risk of falling more than 4 times per day.

The AHRQ and ACSQHC CPGs suggest that balance, mobility limitations, and muscle weakness be assessed to prevent falls. Nurses in the study hospital assessed balance and muscle strength almost twice per day in patients at a high risk of falling but only approximately once a day for patients at a low risk of falling. Given that the study hospital recommends evaluating balance and limb strength more than once per shift, fall prevention

TABLE 5. Differences in the Mean Frequencies of Fall Prevention Practices According to Risk Factors in Patients at a High Risk of Falling

Risk Factor Included in HIIFRM and CPGs	Severity	Patients With Risk Factor	Patients Without Risk Factor	t or F	P
Confusion, disorientation, or impulsivity		5.636	4.025	−16.748	<0.001
Altered elimination		0.519	0.392	−6.014	<0.001
Dizziness/vertigo		1.773	1.085	−18.884	<0.001
Any administered antiepileptics		0.046	0.041	−0.595	0.552
Any administered benzodiazepines					
Get-Up-and-Go test	Pushes up, successful in one attempt	2.545	2.206	188.4	<0.001
	Multiple attempts, but successful	1.876			
	Unable to rise	1.560			

interventions relevant to mobility limitations were documented much less frequently than we had expected.

Because both the patient and caregiver are key players in fall prevention activities, it is important to educate both parties to prevent falls by providing brochures to familiarize them with the environment. A particularly interesting finding was that there were many standardized nursing statements relevant to fall prevention education intended for caregivers, such as "encourage family members or caregivers to reside with the patient." This reflects a unique aspect of Korean healthcare system whereby family members are encouraged to take care of patients.

Regarding differences in nursing activities for fall prevention between fallers and nonfallers, the nurses documented more fall prevention practices for patients who had not fallen than for those who had fallen. In particular, there were large differences in nursing practices related to mental status, dizziness/vertigo, and mobility limitations between these 2 groups. Considering that there is the largest difference in nursing practices related to environmental modifications between patients at high and low risks of falling, fall prevention interventions should include nursing interventions customized to specific risk factors in addition to universal precautions.

Among patients at a high risk of falling, there was more documentation of fall prevention practices tailored to risk factors for those with specific risk factors than for those without specific risk factors. In contrast, patients with moderate to severe muscle weakness and lower limb balance had fewer tailored fall prevention practices related to mobility limitations than those with good power and balance. Considering that more than 70% of falls occur while patients are walking or being transferred,[23,24] nurses may regard ambulatory patients as being more likely to fall than patients with severe mobility limitations. Thus, nurses in the study hospital may have provided more fall prevention interventions related to mobility limitations for patients with good power and balance or only mild lower limb weakness than for patients with severe lower limb weakness.

This study has inherent limitations. First, the generalizability of our findings to other sites may be limited, as our data were collected in patients admitted to a single research site. Second, nursing documentation might not truly reflect the actual practices of nurses in clinical settings. It is conceivable that more nursing activities were provided than the number documented in nurses' progress notes; thus, observations of nurse activities may be more useful for identifying their actual practices.[12] In addition, future research is needed to study ways of improving fall prevention documentation using standardized templates, rigorously evaluate fall prevention implementation approaches, and examine whether fall prevention implementation approaches are associated with fall rates.[10,25]

CONCLUSIONS

We found that the quantity and types of documented nursing activities related to fall prevention differed with the risk of falling, between fallers and nonfallers, and according to the individual patients' risk factors. Nurses documented more activities relevant to fall prevention in their progress notes for patients at a high risk of falling than for those at a low risk of falling. Nurses also documented more fall prevention care for nonfallers than fallers, and they documented more tailored fall prevention interventions for patients with specific risk factors than for those without specific risk factors.

The findings of this study emphasize that individual risk-specific nursing interventions in addition to universal precautions are crucial to preventing falls. Implementing evidence-based fall prevention practices tailored to the risk of falling and the associated risk factors requires a clinical decision support system that provides fall prevention recommendations based on combining the clinical data of patients and knowledge extracted from the CPGs. A clinical decision support system that can support nursing practice and nursing documentation about fall prevention will ensure that nurses' progress notes reflect their activities more accurately and precisely.

REFERENCES

1. Titler MG, Conlon P, Reynolds MA, et al. The effect of a translating research into practice intervention to promote use of evidence-based fall prevention interventions in hospitalized adults: a prospective pre-post implementation study in the U.S. *Appl Nurs Res*. 2016;31:52–59.

2. Dykes PC, Carroll DL, Hurley A, et al. Fall prevention in acute care hospitals: a randomized trial. *JAMA*. 2010;304:1912–1918.

3. Oliver D. Falls risk-prediction tools for hospital inpatients. Time to put them to bed? *Age Ageing*. 2008;37:248–250.

4. Wilson DS, Montie M, Conlon P, et al. Nurses' perceptions of implementing fall prevention interventions to mitigate patient-specific fall risk factors. *West J Nurs Res*. 2016;38:1012–1034.

5. Dykes PC, Burns Z, Adelman J, et al. Evaluation of a patient-centered fall-prevention tool kit to reduce falls and injuries: a nonrandomized controlled trial. *JAMA Netw Open*. 2020;3:e2025889.

6. Cameron ID, Dyer SM, Panagoda CE, et al. Interventions for preventing falls in older people in care facilities and hospitals. *Cochrane Database Syst Rev*. 2018;9:Cd005465.

7. Carter EJ, Khasnabish S, Adelman JS, et al. Adoption of a patient-tailored fall prevention program in academic health systems: a qualitative study of barriers and facilitators. *OBM Geriatrics*. 2020;4:1–15.

8. Gillespie BM, Walker R, Lin F, et al. Wound care practices across two acute care settings: a comparative study. *J Clin Nurs*. 2020;29:831–839.

9. Gillespie LD, Robertson MC, Gillespie WJ, et al. Interventions for preventing falls in older people living in the community. *Cochrane Database Syst Rev*. 2012;2012:Cd007146.

10. Turner K, Staggs V, Potter C, et al. Fall prevention implementation strategies in use at 60 United States hospitals: a descriptive study. *BMJ Qual Saf*. 2020;29:1000–1007.

11. Cho I, Park HA, Chung E. Exploring practice variation in preventive pressure-ulcer care using data from a clinical data repository. *Int J Med Inform*. 2011;80:47–55.

12. Gillespie BM, Chaboyer W, Kang E, et al. Postsurgery wound assessment and management practices: a chart audit. *J Clin Nurs*. 2014;23:3250–3261.

13. Jung H, Park HA, Hwang H. Improving prediction of fall risk using electronic health record data with various types and sources at multiple times. *Comput Inform Nurs*. 2020;38:157–164.

14. Ganz D, Huang C, Saliba D, et al. *Preventing Falls in Hospitals: A Toolkit for Improving Quality of Care*. Maryland: Agency for Healthcare Research and Quality; 2013.

15. Heaslop M, Delbaere K, Salisbury J, et al. *Preventing Falls and Harm From Falls in Older People. Best Practice Guidelines for Australian Hospitals*. New South Wales: Australian Commission of Safety and Quality in Health Care; 2009.

16. Kim KS, Kim JA, Kim MS, et al. Development of performance measures based on the nursing process for prevention and management of pressure ulcers, falls and pain. *J Korean Clin Nurs Res*. 2009;15:133–147.

17. Healey F, Oliver D, Milne A, et al. The effect of bedrails on falls and injury: a systematic review of clinical studies. *Age Ageing*. 2008;37:368–378.

18. Lindo J, Stennett R, Stephenson-Wilson K, et al. An audit of nursing documentation at three public hospitals in Jamaica. *J Nurs Scholarsh*. 2016;48:499–507.

19. Broderick MC, Coffey A. Person-centred care in nursing documentation. *Int J Older People Nurs*. 2013;8:309–318.

20. Jasemi M, Zamanzadeh V, Rahmani A, et al. Knowledge and practice of Tabriz teaching hospital's nurses regarding nursing documentation. *Thrita J Med Sci*. 2012;2:133–138.

21. Considine J, Trotter C, Currey J. Nurses' documentation of physiological observations in three acute care settings. *J Clin Nurs*. 2016;25:134–143.

22. Bunn F, Dickinson A, Simpson C, et al. Preventing falls among older people with mental health problems: a systematic review. *BMC Nurs*. 2014;13:4.

23. Choi EJ, Lee YS, Yang EJ, et al. Characteristics and risk factors for falls in tertiary hospital inpatients. *J Korean Acad Nurs*. 2017;47:420–430.

24. Schoene D, Wu SM, Mikolaizak AS, et al. Discriminative ability and predictive validity of the timed up and go test in identifying older people who fall: systematic review and meta-analysis. *J Am Geriatr Soc*. 2013;61:202–208.

25. Proctor EK, Powell BJ, McMillen JC. Implementation strategies: recommendations for specifying and reporting. *Implement Sci*. 2013;8:139.