

A Case Control Study to Improve Accuracy of an Electronic Fall Prevention Toolkit

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Abstract

Patient falls are a serious and commonly report adverse event in hospitals. In 2009, our team conducted the first randomized control trial of a health information technology-based intervention that significantly reduced falls in acute care hospitals. However, some patients on intervention units with access to the electronic toolkit fell. The purpose of this case control study was to use data mining and modeling techniques to identify the factors associated with falls in hospitalized patients when the toolkit was in place. Our ultimate aim was to apply our findings to improve the toolkit logic and to generate practice recommendations. The results of our evaluation suggest that the fall prevention toolkit logic is accurate but strategies are needed to improve adherence with the fall prevention intervention recommendations generated by the electronic toolkit.

Keywords: patient falls, fall prevention, nursing, health information technology.

Background and Significance

Patient falls are a commonly reported adverse event and a leading cause of preventable injury in all healthcare settings. Hospitalization increases the risk for falls.¹ Older adults are more likely to sustain injuries from falls² and injurious falls drive up hospital costs and lengths of stay.^{2,3} Based on the number of older Americans discharged from hospitals in 2008⁴ and published fall rates in this population,⁵ approximately 2.5 million older Americans fell while hospitalized in that year and approximately 200,000 sustained an injury. As of 2008, the care provided for fall related injury in acute care hospitals is no longer reimbursable by the Centers for Medicare and Medicaid Services (CMS).⁶

Over and above physical and mental health costs, the economic costs of falls are a tremendous burden on our healthcare system. As noted in **Table 1**, even falls without injury are costly (approximately \$460 per patient⁷) and patient falls are associated with many potential negative consequences for the patient, caregiver, and system.⁷⁻¹² The total annual cost of all falls to the US health care system is over 28.2 billion dollars.⁸ Mean estimated costs of injurious fall treatment in older adults in a 3-year period in all types of settings (2004 -2006) were approximately \$28,000 per case.¹³ The Centers for Disease Control and Prevention (CDC) estimates that the costs of hospitalization associated with fall related injury for adults ages 65 and older exceeded 5.8 billion dollars in 2005.¹⁴

Table 1: Potential Consequences of Patient Falls⁷⁻¹²

Patients	<ul style="list-style-type: none"> • Diagnostic tests • Fear of falling → decreased mobility • Change in living situation/loss of independence
Caregivers	<ul style="list-style-type: none"> • Feelings of guilt
Family	<ul style="list-style-type: none"> • Changes in beliefs of patient independence and capacity to return home • Time to complete incident report and pursue follow-up actions (e.g., assessment and diagnostic tests)
Hospital staff	<ul style="list-style-type: none"> • Feelings of guilt if they feel responsible (e.g., did not do accurate assessment or did not follow intervention plan).
System	<ul style="list-style-type: none"> • Cost of staff time for completing incident report and follow-up activities
Hospital	<ul style="list-style-type: none"> • Public reporting of fall • Posting of poor quality indicator
Payer	<ul style="list-style-type: none"> • Cost of diagnostic tests and extended hospital stay for completing tests (may default to hospital if payer is CMS)

While fall prevention research has been conducted in hospital settings for decades, most of the evidence relates to factors that place hospitalized patients at risk for falls. As a result, many evidence-based fall risk assessment tools

are available for use in acute hospital settings.¹⁵ Until recently, there were no known intervention protocols to prevent hospitalized patients from falling.¹⁶ From 2007-2009, our team was funded by the Robert Wood Johnson Foundation to identify linkages between fall risk assessment and interventions to prevent patient falls.

We conducted a three phase study as follows.

- **Phase 1:** Qualitative inquiry. Qualitative methods were used to identify from the perspectives of stakeholders (professional and paraprofessional providers, patients who had fallen while hospitalized and family) why patients in acute care hospitals fall and the set of interventions perceived to be both effective and feasible in busy acute care settings.^{17,18}
- **Phase 2:** Iterative toolkit development and implementation. Qualitative data from phase 1 were used to inform toolkit development. The fall prevention toolkit, Fall TIPS (Tailoring Interventions for Patient Safety), was developed in consultation with end users and informaticians with human factors expertise. The Fall TIPS Toolkit (FTTK) was implemented on randomly selected intervention units in 4 Partners HealthCare acute care hospitals.¹⁹
- **Phase 3:** A cluster randomized control trial was conducted to evaluate the effectiveness of the Fall TIPS toolkit.²⁰

Through this study,²⁰ we demonstrated that a safety platform consisting of the following three components significantly reduced patient falls in acute care hospitals: 1) a protective physical environment, 2) care team member competence in their ability to prevent falls, and 3) the FTTK that leverages health information technology to ensure bedside access to an evidence-based and tailored fall prevention plan. Each component is described in **Table 2**.

Table 2: Components of the Safety Platform Underlying the Evidence-based Fall Prevention Model

A protective physical environment (Kruger et al., 2006).	<ul style="list-style-type: none"> • Immediate access to necessary assistive devices • Presence of safe surroundings without unsafe conditions <ul style="list-style-type: none"> ▫ Call bell close at hand ▫ Clear path to bathroom ▫ Bed alarm (if needed) ▫ Durable call light pull cords in bathroom ▫ Intravenous poles with wide base of support ▫ No frayed carpet, hazardous floor treads, or floor washing when patients in that area
Care team competence	<ul style="list-style-type: none"> • Knowledge and competence to carry out the care plan including: <ol style="list-style-type: none"> 1) Comprehensive standardized identification of specific patient fall risk factors 2) Explicit evidence-based interventions to decrease, manage or ameliorate risks 3) Skill to carry out tailored interventions identified for known risks • Proficiency in actions to prevent patient falls • Persistent adherence with actions needed to prevent patient falls
Fall TIPS Toolkit (FTTK)	<ul style="list-style-type: none"> • Health information technology to automate the following: <ul style="list-style-type: none"> ▫ Calculation of the set of interventions most likely to prevent falls based on patient-specific risk profile ▫ Decision support related to patient-specific risk profile and recommended interventions to generate alerts that are available at the bedside for all team members including patients and family caregivers

In summary, our research demonstrates that the FTTK works to prevent falls²⁰ by leveraging health information technology and accurate fall risk assessments to generate tailored care plans that are available pictorially and in plain text at the bedside for all key stakeholders (patients, family, staff) to follow. The FTTK is based on the Morse Fall Scale (MFS) risk assessment tool. The MFS predicts anticipated physiological falls which are defined as falls that occur in patients identified as “fall prone” due to the presence of one or more factors known to increase the likelihood of falling.²¹ The FTTK should in theory prevent 78% of falls²¹ as long as the MFS risk assessment is completed correctly and the interventions that are recommended by the FTTK are consistently implemented. However, we found during our trial that only 22% of falls were prevented. Therefore, the purpose of this case control study is to evaluate why some patients on intervention units with access to the FTTK fell. We aimed to identify the factors

associated with falls in hospitalized patients when the FTTK was in place. This study was reviewed and received institutional review board approval from the Partners HealthCare Human Research Committee.

Research Methods

Our research questions were as follows:

1. Why did some patients on experimental units with access to the FTTK fall?
2. What factors are associated with falls in younger patients?
3. What factors are associated with falls in older patients?

Patient Selection: Cases included inpatients that fell on intervention units at four Partners HealthCare acute care hospitals where the FTTK was in place from January 1- June 30, 2009. Patient falls were defined as, “an unplanned descent to the floor”.²² Controls were randomly selected from patients who were admitted to intervention units within the same 6-month period and did not fall. Controls were matched for gender, age (within 5 years), first MFS total score and unit length of stay (within 24hr) up to the time of the fall. Cases were included in the analysis if they had 3 or more matches.

Clinical Data: A nurse investigator (EC) abstracted clinical data for each case and control from the FTTK database including demographics, MFS total score, and the nursing interventions (recommended by the FTTK based on the patient’s risk profile and tailored by the nurse based on knowledge of the patient) during the study period (**Table 3**). The nurse investigator also gathered the fall incident data from incident reporting systems for each case including unit length of stay at the time of the fall. A second investigator (PD) validated abstraction for a random selection of 10% of cases and controls with agreement >90%.

Table 3. List of variables assessed for correlation with fallers and non fallers	
Admission/Demographic	
Age	Insurance status
Gender	Admission Morse Fall Scale Total Score
Race	
Day before the event	
Length of stay	
Nursing Interventions	
Safety precautions	IV assistance when walking
Document previous fall	Out of bed with assistance
Review medication list	1 person
PT consult	2 persons
Consult with MD/pharmacist	Bed/chair alarm turned on
Toileting schedule using	Bed close to nurse station
Bed pan	Frequent checks; re-orientation
Commode	
Assist to bathroom	
Provide ambulatory aid	
Crutches	
Cane	
Walker	

Statistical Methods: Descriptive statistics using two-by-two tables were generated to describe demographic data (patient characteristics, see **Table 4**) of cases and controls including percentages within each case/control group. Differences in patient characteristics for cases and controls were evaluated using conditional logistic regression (controlling for site and matching). A priori variables considered for a multivariate conditional logistic regression model included the following significant intervention variables (P<0.05, see **Table 5**): Document previous fall, out

of bed with assist, 1-person assist, 2-person assist, cane, bed/chair alarm, bed close to nursing station, and frequent checks/reorientation. Due to the relatively small sample size, after adjusting for significant patient characteristics (insurance status and total MFS, see **Table 4**), we entered one FTTK intervention exposure into the model at a time. Exact P-values were calculated where feasible. All P-values were two tailed and a P value <0.05 was considered statistically significant. All analyses were performed using the SAS 9.2 statistical package.

Results

A total of 67 patients fell on intervention units during the 6-month intervention period. Of the patients who fell, one was excluded due to incomplete data. Of the remaining cases, 48 had three or more matches for gender, age (within 5 years), first MFS total score and unit length of stay) for a total sample size of 192. The sample included 88 patients age 64 or younger and 104 patients age 65 or older. Patient characteristics of cases and controls are included in **Table 4**.

Table 4. Patient Characteristics†			
All patients	Cases	Controls	P value
All Patients	48	144	
Age(mean± SD)	63.73(17.8)	63.49(17.6)	.185
Female n (%)	22 (45.8)	66 (45.8)	1.0
Race n (%)			.863
White/Caucasian	38(79.2)	108(75)	
Black/African American	4(8.3)	14(9.7)	
Hispanic/Latino/Spanish	2(4.2)	14(9.7)	
Asian	1(2.1)	3(2.1)	
Other	3(6.3)	5(3.5)	
Insurance n (%)			.043*
Medicare	29(60.4)	87(60.4)	
Medicaid	8(16.7)	7(4.9)	
Commercial	9(18.8)	44(30.6)	
Other	2(1.0)	6(4.2)	
Admission Morse Fall Scale score (SD)	55(25.3)	54.76(23.2)	.692
Morse Fall Scale score prior to fall(SD)**	60.63(25.0)	45.8 (22.8)	.002*
Patients aged < 65 y	Cases	Controls	P value
No. of patient	22	66	
Age(mean± SD)	47.18(10.9)	47.09(10.9)	.973
Female n (%)	10(45.5)	30(45.5)	1.0
Race n (%)			.758
White/Caucasian	18(81.8)	43(65.2)	
Black/African American	1(4.6)	8(12.1)	
Hispanic/Latino/Spanish	1(4.6)	11(16.7)	
Asian	0(0)	2(3.0)	
Other	2(9.1)	2(3.0)	
Insurance n (%)			.049*
Medicare	4(18.2)	16(24.2)	
Medicaid	8(36.4)	7(10.6)	
Commercial	9(40.9)	39(59.1)	
Other	1(4.6)	4(6.1)	
Admission Morse Fall Scale score (SD)	48.18(18.62)	51.59(22.57)	.472
Morse Fall Scale score prior to fall (SD)**	56.8(20.2)	34.5(16.0)	.001*

†Controlled for site and matching

*Significant differences between cases and controls adjusted in regression model

**Morse Fall Scale Score prior to fall (cases) or equivalent point in time (controls)

Table 4. Patient Characteristics (Continued)			
Patients aged ≥ 65 years	Cases	Controls	P value
No. of patient	26	78	
Age(mean± SD)	77.7(7.32)	77.4(7.07)	.1152
Female n (%)	12(46.2)	36(46.2)	1.0
Race n (%)			.883
White/Caucasian	20(76.9)	65(83.3)	
Black/African American	3(11.5)	6(7.7)	
Hispanic/Latino/Spanish	1(3.9)	3(3.9)	
Asian	1(3.9)	1(1.3)	
Other	1(3.9)	3(3.9)	
Insurance n (%)			.930
Medicare	25(96.2)	71(91.0)	
Medicaid	0(0)	0(0)	
Commercial	0(0)	5(6.4)	
Other	1(3.9)	2(2.6)	
Admission Morse Fall Scale score (SD)	60.77(28.9)	57.44(23.5)	.094
Morse Fall Scale score prior to fall(SD)	63.9(28.4)	55.4(23.3)	.235

The univariate conditional logistic regression analyses completed to answer the first research question, *Why did some patients on experimental units with access to the FTTK fall?*” showed significant associations for the following seven interventions: document previous falls, out of bed with assistance, one person assist, two person assist, bed/chair alarm, bed close to nursing station, and frequents checks/reorientation (**Table 5**). These seven variables were entered into a conditional logistic regression equation (**Table 6**) and findings suggest that cases (fallers) were 5.7 times more likely than matched controls (non fallers) to be patients who were before the fall known to require assistance getting out of bed (e.g., the FTTK recommended this intervention based on the MFS fall risk profile).

The univariate conditional logistic regression analyses completed to answer the second research question, *“What factors are associated with falls in younger patients?”* showed significant associations for the following six interventions: document previous falls, out of bed with assistance, one person assist, bed/chair alarm, bed close to nursing station, and frequents checks/reorientation (**Table 5**). However, after entering these variables entered into the conditional logistic regression model and adjusting for insurance and Total MFS before the fall, none of them remained significant (**Table 6**).

The univariate conditional logistic regression analyses completed to answer the third research question, *“What factors are associated with falls in older patients?”* showed significant associations for the following three interventions: ambulatory aid: cane, out of bed with assistance, and two person assist (**Table 5**). These three variables were entered into the conditional logistic regression equation (**Table 6**) and findings suggest that cases (fallers) were significantly less likely than matched controls (non fallers) to be patients who before the fall did not use a cane as an ambulatory aid. Fallers were also 10.1 times more likely than matched controls (non fallers) to be patients who were before the fall known to require assistance getting out of bed (e.g., the FTTK recommended this intervention based on the MFS fall risk profile) and were 14.26 times more likely than non fallers to be known before the fall to require 2 people for assistance when getting out of bed or walking (e.g., the FTTK recommended this level of assistance based on the MFS fall risk profile).

Table 5. Univariate Associations between the FTTK intervention exposures and falls are included in bold type. Significant associations ($p < .05$) were selected for inclusion in the multivariate regression model.

	Cases n(%)	Controls n(%)	P-Value
All patients	48	144	
Safety Precautions	38(19.8)	100(52.1)	.118
Document Previous Fall	22(11.5)	27(14.1)	.003
Review Medication List	38(19.8)	113(58.9)	.807
Consult with MD/Pharm	31(16.1)	81(42.2)	.865
Physical Therapy Consult	20(10.4)	37(19.3)	.118
Toileting Schedule	36(18.8)	103(53.6)	.989
Bedpan	10(5.2)	24(12.5)	.770
Commode	2(1)	9(4.7)	.551
Bathroom	22(11.5)	67(34.9)	.941
Provide Ambulatory Aid	10(5.2)	36(78.3)	.246
Crutches	0(0)	1(.69)	†
Cane	1(.5)	17(8.9)	.060
Walker	8(4.2)	11(5.7)	.089
IV Assistance	41(21.4)	121(63)	.405
Out of Bed with Assist	35(18.2)	52(27.1)	.000
1 Person Assist	24(12.5)	41(21.4)	.040
2 Person Assist	11(5.7)	11(5.7)	.006
Bed/Chair Alarm	24(12.5)	32(16.7)	.003
Bed Close to Nursing Station	16(8.3)	23(12)	.042
Frequent checks/Reorientation	18(9.4)	24(12.5)	.025
Patients aged < 65 y	22	66	
Safety Precautions	17(19.3)	43(48.9)	.063
Document Previous Fall	10(11.4)	3(3.4)	.001
Review Medication List	17(19.3)	50(56.8)	.578
Consult with MD/Pharm	15(17)	37(42)	.332
Physical Therapy Consult	7(8)	11(12.5)	.322
Toileting Schedule	17(19.3)	44(50)	.631
Bedpan	3(3.4)	6(6.8)	.605
Commode	1(1.1)	3(3.4)	.693
Bathroom	12(13.6)	33(37.5)	.851
Provide Ambulatory Aid	2(2.3)	11(12.5)	.172
Crutches	1(1.52)	0 (0)	†
Cane	0(0)	3(3.4)	.995
Walker	2(2.3)	3(3.4)	.262
IV Assistance	18(20.5)	52(59.1)	.512
Out of Bed with Assist	13(14.8)	16(18.2)	.010
1 Person Assist	10(11.4)	11(12.5)	.034
2 Person Assist	3(3.4)	5(5.7)	.369
Bed/Chair Alarm	11(12.5)	7(8)	.003
Bed Close to Nursing Station	8(9.1)	5(5.7)	.012
Frequent checks/Reorientation	8(9.1)	7(8)	.023

† Too few to calculate

Table 5. Univariate Associations (Continued)

Patients aged ≥ 65 y	26	78	
Safety Precautions	21(20.2)	57(54.8)	.812
Document Previous Fall	12(11.5)	24(23.1)	.416
Review Medication List	21(20.2)	63.75(60.6)	.691
Consult with MD/Pharm	16(15.4)	44(42.3)	.686
Physical Therapy Consult	13(12.5)	26(25)	.284
Toileting Schedule	19(18.3)	59(56.7)	.588
Bedpan	7(6.7)	18(17.3)	.734
Commode	1(1)	6(5.8)	.624
Bathroom	10(9.6)	34(32.7)	.480
Provide Ambulatory Aid	8(7.7)	25(24)	.436
Crutches	0 (0)	0(0)	†
Cane	1(1)	14(13.5)	.047
Walker	6(5.8)	8(7.7)	.172
IV Assistance	23(22.1)	69(66.3)	.574
Out of Bed with Assist	22(21.2)	36(34.6)	.004
1 Person Assist	14(13.5)	30(28.8)	.511
2 Person Assist	8(7.7)	6(5.8)	.005
Bed/Chair Alarm	13(12.5)	25(24)	.242
Bed Close to Nursing Station	8(7.7)	18(17.3)	.526
Frequent checks/Reorientation	10(9.6)	17(16.3)	.262

†too few to calculate

The conditional logistic regression models for fallers and matched controls, controlling for site are included in **Table 6**. All variables with significant p values ($p < .05$) were included in the models.

Table 6. Conditional Logistic Regression Models for Fallers and Matched Controls				
All patients	Intervention	Unadjusted p-value*	Adjusted p-value**	Odds Ratio 95% CI
	Document Previous Fall	.003	.364	
	Out of Bed with Assist	.000	.001	5.7 (2.0, 16.24)
	1 Person Assist	.040	.106	
	2 Person Assist	.006	.08	
	Bed/Chair Alarm	.003	.279	
	Bed Close to Nursing Station	.042	.983	
	Frequent checks/Reorientation	.025	.474	
Patients aged <65	Intervention	Unadjusted p-value*	Adjusted p-value**	
	Document Previous Fall	.001	.266	
	Out of Bed with Assist	.010	.907	
	1 Person Assist	.034	.417	
	Bed/Chair Alarm	.003	.259	
	Bed Close to Nursing Station	.012	.279	
	Frequent checks/Reorientation	.023	.365	
Patients aged ≥65	Intervention	Unadjusted p-value*	p-value	Odds Ratio 95% CI
	Cane	.047	.041	.073 (.006, .89)
	Out of Bed with Assist	.004	.005	10.1 (2.0, 50.7)
	2 Person Assist	.005	.006	14.26 (2.2, 94.5)

*Controlling for site

**Adjusted for insurance and Total MFS before fall

Discussion

This study was conducted to identify why patients on intervention units with access to the FTTK fell. The FTTK is based on the MFS that predicts anticipated physiological falls which account for 78% of falls that occur in hospital settings.²¹ Therefore, if the MFS fall risk assessment is completed properly, the tailored interventions recommended by the FTTK are accurate, and recommendations are consistently applied, the FTTK should reduce falls by 78%. However, the results of our RCT indicate that the FTTK reduced falls by 22%.²⁰ This study evaluated patients who fell on intervention units where the FTTK was in place. Fallers were matched with similar controls (matched on gender, age, first MFS total score, and length of stay up to time of fall) and our findings suggest that patients for whom the FTTK recommended assistance getting out of bed and while walking were significantly more likely than matched controls to fall. We reviewed patients' medical records and the incident reports of all falls that occurred when the FTTK was used, to learn whether there was a problem with the FTTK software that could be corrected. We found that the intervention plan recommended by the FTTK was accurate, but it was not followed at the time of the fall. Not surprisingly, if the recommended plan is not followed, the FTTK will not prevent a fall from occurring. In addition to requiring increased levels of assistance when getting out of bed and walking, older patients who fell were less likely to use a cane as an ambulatory aid (e.g., in this sample, the use of a cane while walking appears to be protective against a fall). While we found several significant associations between interventions recommended by the FTTK and patient falls for patients aged less than 65, none of those associations remained significant after controlling for patient characteristics (insurance, MFS score prior to fall). Based on the incident reports reviewed, common reasons why younger patients in this sample fell include sudden attacks of dizziness and instability due to an acute medical condition.

The FTTK logic automatically recommends assistance of one person for patients with a weak gait and two-person assist for an impaired gait. This is the level of assistance that professional and paraprofessional providers told us was needed when we conducted our qualitative research to inform the FTTK logic.¹⁸ However, we found when reviewing incident reports of patients who fell that despite the planned assistance, patients were consistently alone at the time of the fall (patient nonadherence) or that there was only one person walking with a patient who was known to have an impaired gait and require two-person assistance when walking (provider nonadherence). These results highlight the importance of consistent adherence to planned interventions to prevent patient falls. Other studies have also identified suboptimal adherence with fall prevention interventions. Nyberg²³ reported that two-thirds of falls occurring on a rehabilitation unit were related to lack of adherence with the plan either by care team members (9%) or by patients (58%). Krauss²⁴ described poor adherence with toileting schedules, therapy consults and provision of assistive devices. Koh²⁵ found the lack of supporting staff, insufficient knowledge and lack of motivation to be major barriers to the implementation of a fall prevention clinical practice guideline in Singapore hospitals.

Based on this work, several practice recommendations are warranted. First, nurses and other care team members should educate patients about the risk for falling and the effects of medications and other hospital-based treatments that place patients at risk for falls. We learned in our qualitative work¹⁷ that patients often report that nurses routinely tell them that they are at risk for falls, but may not convey why they are at risk based on their personal fall risk profile. The fall prevention education in hospitals is often generic and individual patients may not be included in developing a fall prevention plan that is tailored to patient-specific determinants of risk. Strategies are needed to partner with patients and family caregivers so that all care team members are aware of and working from the same plan. The FTTK generated a single-paged patient education handout that was tailored based on the patients' fall risk profile. We were unable to find documentation in the medical record or in incident reports to identify the degree to which this patient-centered educational tool was used for patients who fell. It is possible that the tailored educational handout was insufficient to help the patients who fell to fully understand what factors placed them at risk and what the patient's role was in preventing a fall while hospitalized.

Our findings suggest that approaches are needed to enhance both patient and provider adherence with the fall prevention intervention recommendations generated by the FTTK. Research in this area has determined that many older patients view falls as a normal consequence of aging.²⁶ Moreover, older patients often perceive fall prevention intervention strategies as restrictive and a potential threat to independence.^{27,28} Unless education and intervention plans are perceived as relevant and meaningful, patients may not see themselves as vulnerable until after a fall has occurred.^{17,29} Rush (2008) found that patient perceptions of risk influenced whether or not they called for help. Involving patients and their family caregivers in the fall risk assessment and planning process may limit inherent differences in perceptions of risk and improve ownership of the planned interventions.⁹ In addition, existing workflows may require modification to ensure that nurses and other providers can consistently offer the assistance that patients need to get out of bed safely. Provider adherence with interventions such as two person assist for patients with an impaired gait is difficult to

consistently implement because they may require additional staffing. However, it is possible that care redesign may also be a solution. Frequent rounding has been identified as an effective intervention for preventing patient falls.³⁰ However, given staffing patterns on acute medical units, providing frequent rounds for every patient may not be feasible. The FTTK could be used to target patients whose safety is dependent on this intervention; patients with an impaired gait and those who are unable or unwilling to call for help.

This study has several limitations. While over 5,000 patients were included in the intervention arm of our original trial of the FTTK,²⁰ patient falls are a relatively infrequent problem. We started with 67 cases and after completing the matching protocol, our final number of cases was reduced to 48. The sample size limits the depth of the analysis, but provides a baseline from which we will continue to refine the FTTK and make recommendations for practice. In addition, the FTTK database provides information on recommended interventions only and documentation of actual interventions in patient records and incident reports may be incomplete. Abstracted data used in this analysis is based on the data that was documented in the medical record and on fall incident reports. It is possible that additional interventions may have been implemented, but not documented.

Conclusion

Patient falls are a significant problem in hospitals. Evidence to date suggests that while fall prevention interventions are quite simple, (i.e., appropriate levels of assistance with getting out of bed and walking, access to assistive devices, frequent elimination assistance, timely response to call lights, increased surveillance), unless interventions are tailored to patient-specific areas of risk and carried out consistently, hospitalized patients will continue to fall. Acute care hospitals are busy and the workflow is complex. Intervention plans to provide a generic set of fall prevention interventions to all patients are not feasible and represent a waste of precious time and resources.

The results of this evaluation suggest that strategies are needed to improve both patient and provider adherence with the tailored fall prevention recommendations generated by the FTTK. In particular, patient and provider adherence with ensuring that hospitalized patients in need of assistance to get out of bed safely, is consistently met. This requirement is linked to both health information technology and practice changes. Information systems are needed to calculate the set of interventions most likely to prevent a fall, based on the patient-specific fall risk profile. While the FTTK provided a means to automatically calculate a tailored plan and to integrate the plan into the clinical workflow, this alone is insufficient to prevent falls. All care team members (including patients and family caregivers) must consistently follow the plan. A commitment by clinical staff to educate patients is needed so that patients will fully understand their personal fall risk profile, the associated plan, and how they can work with the care team to prevent a fall while hospitalized. Additional work is also needed to assist clinical staff with prioritizing care based on the assessed needs of the patient. Electronic tools such as the FTTK are available to facilitate identifying the interventions most likely to decrease risk in hospitalized patients. A commitment of clinical leadership is needed to implement models of care that leverage health information technology to ensure that interventions are provided at the individual patient level in an effective and efficient manner.

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