

Original Articles

Acute care patient falls: evaluation of a revised fall prevention program following comparative analysis of psychiatric and medical patient falls

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Abstract

Eliminating falls and fall-associated injuries are priorities in health care. This study examined the impact of revised fall prevention interventions on psychiatric and medical patient falls. After policy revisions were well established, psychiatric falls diminished and medical falls increased. A contributing factor to the medical population finding was policy intervention noncompliance.
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1. Introduction

Patient safety and quality patient outcomes are of primary importance in health care. Renewed awareness of patient safety has been heightened due to The Centers for Medicare and Medicaid Services payment reforms for “never events” (CMS Expands the List, 2008), including inpatient fall-associated injuries. Falls can and do result in injuries to patients. Injuries can prolong hospital stays. Reducing patient falls and eliminating injuries resultant from them are crucial to improved patient safety in the acute care setting. Evaluation of fall prevention program effectiveness is a vital aspect in addressing patient safety that is often overlooked. Simply having a program in place can provide false security; health care workers can be lured into thinking the program is capable of preventing patient falls. This is not true.

Factors associated with fall events yield insight about patients who have a tendency to fall. According to Chang et al. (2004), “a multifactorial falls risk assessment and management programme was the most effective component” for fall prevention. Risk assessments can be beneficial in preventing falls as Oliver, Daly, Martin, & McMurdo (2004) have suggested, but providing measures to prevent falls, such as adequate staffing and ensuring a safe environment, are health care responsibilities that should be applied to all patients. Why administer fall risk assessment for patients and required

reporting of fall events if the information is not utilized to prevent patient falls in the future?

Moreover, preventative interventions are only effective when practiced. This obvious point has been highlighted by Hitcho et al. (2004), “Interventions to prevent falls were inconsistently used before or at the time of fall.” Nevertheless, research exploring acute inpatient fall prevention interventions and staff compliance is limited in the published literature.

This organization incorporated the Morse Fall Scale (MFS; Morse, 1997) as its method for assessing patient fall risk in January 2005. Then, Dr. Janice Morse visited the hospital in early 2006 to assist the Fall Prevention Committee (FPC), and patient care administrators evaluate the Fall Assessment and Prevention Program. As a result, a clinical research consultant was hired to conduct intensive research into medical inpatient falls. Thereafter, the Fall Assessment and Prevention Policy (the Policy) underwent major revisions to include simplification of the fall risk assessment categories and revised fall prevention interventions, for example, slipper sock footwear, patient fall prevention brochure, high fall risk patient medication profile review.

The purpose of this study was to comparatively analyze falls in psychiatric and medical inpatient populations prior to, during, and after revisions were made to the Policy. Secondly, nursing knowledge and perceived effectiveness of the revised fall prevention interventions were assessed.

1.1. Framework

Donabedian’s Model of Healthcare Quality utilizing structure, process, and outcomes (Polit & Beck, 2004)

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served as the framework to guide this research. Specifically, continual analysis of policy (structure) and nursing interventions (process) should positively impact and improve overall patient safety with regard to patient falls and fall-associated injuries (outcomes).

2. Method

2.1. Study design

The research study was retrospective and comparative in design and was conducted in two phases over a 2-year period. Phase I encompassed falls that occurred from October 1, 2005, through September 30, 2006, on the psychiatry department and general medicine unit, whereas fall events occurring in the following year (October 1, 2006, to September 30, 2007) were studied in Phase II. The MFS was fully embedded in nursing practice prior to initiation of the study. Characteristics evaluated included gender, age, and mental status of patients who fell; types of falls (Morse, 1997); severity of injury (Morse, 1997) incurred; and fall prevention intervention compliance.

During Phase II, an anonymous survey was developed and distributed to nursing staff housewide. This electronic questionnaire gauged the knowledge and perceptions of nurses and nursing assistants regarding the effectiveness of fall interventions in the 2006 revised Policy. The 15-question survey was available for a 2-week period. A true/false or yes/no format was used for most of the questions, several questions were multiple choice or open-ended, and three demographic questions were included.

2.2. Participants

Psychiatric and medical falls involving patients 18 years and older without regard to gender, ethnicity, or mental status were eligible for study inclusion. Underage persons, pregnant women, and incarcerated individuals were excluded. However, during the study period, none of the psychiatric and medical falls met these exclusion criteria.

Fall occurrences reported for adult psychiatric and medical patients in Phase I totaled 87 events, and 95 psychiatric and medical falls occurred during Phase II of the study. One hundred sixty practitioners responded to the anonymous questionnaire. Upon review of the survey data, nursing staff in areas utilizing interventions particular only to their specialties were excluded, that is, birthing center, pediatrics, special care nursery, surgical suite, secure care, emergency department, and radiology. Nursing staff who did not deliver direct patient care (clinical resource management, risk management) were also excluded. The survey sample ($N = 104$) was composed of respondents working in clinical areas utilizing all Policy interventions (critical care, telemetry, inpatient rehabilitation, medical, oncology, orthopaedics/neurology, psychiatry, and surgical).

2.3. Setting

In this 258-bed, not-for-profit, community hospital, the Department of Psychiatry Services is composed of three units: two adult units (age 18–64 years) and a geriatric unit (age ≥ 65 years). Average Daily Census (ADC) in the three units for Phase I was 21.72, whereas Phase II ADC was 21.38. The hospital's Medical–Surgical Department is composed of seven units. Only patients admitted to the general medicine unit, who fell, were included in the comparison with psychiatric inpatients incurring falls. Medical ADC was 26.53 and 26.86 during study Phases I and II, respectively.

2.4. Policy revisions

The Policy changes of 2006 addressed a number of fall prevention interventions, as previously mentioned. The FPC initiated trials with a different type of nonskid slipper sock on each inpatient department, and after unanimous approval by staff and patients, the facility's sock vendor was changed. In collaboration with the organization's Corporate Communications Department, the FPC designed a Fall Prevention and Awareness Education Brochure for patients to be reviewed upon admission to the hospital. The MFS does not directly address patient medication profiles, although it does score whether or not the patient has a secondary diagnosis. Taking these two things into consideration, medication profile review by pharmacy was added to the high fall risk patient interventions. In addition, annual staff education became mandatory. All nurses and nursing assistants were required to watch an MFS educational CD (Hill-Rom Services, Inc., 2003). The formal study described herein commenced in October 2005. Five of the 12 months of Phase I data involved study of falls that occurred following implementation of the 2006 Policy revisions while the changes were yet very new. All fall data examined in Phase II involved events that occurred under the well-established revised Policy.

2.5. Data collection and analysis

Psychiatric and medical patient fall data were collected from the organization's Fall Evaluation Tool (FET), a macro-enabled MS Excel format accessed via Meditech. Risk management summary reports and the organization's medical record database ChartMaxx[®] were also utilized in data collection. Zoomerang[™] tabulation of survey response data was followed by thematic delineation analysis.

Data analysis included calculation of mean age, demographic frequencies, fall rates, fall injury rates, chi-squared goodness-of-fit test, correlation coefficient, and regression analysis. All statistical tests used a confidence level of 95% and an alpha value of .05. Rates were calculated according to the formulas: fall rate = number of falls / occupied bed days \times 1,000 (Morse, 1997), and fall injury rate = number of injurious falls / occupied bed days \times 1,000.

Table 1
Comparison of psychiatry and medical patient fall occurrences between Phases I and II

Demographics of patients who fell	Phase I		Phase II	
	Psychiatry (n = 62)	Medical (n = 25)	Psychiatry (n = 42)	Medical (n = 53)
Gender (n)				
Males	19	12	11	24
Females	43	13	31	29
Age (years)				
M	59.34	71.16	58.21	65.11
Range	21–90	49–89	23–88	21–90
Male mean	58.05	68.42	68.64	63.58
Female mean	57.95	73.69	54.52	66.38
Nongeriatric and geriatric status (n)				
<65 years	41	7	25	23
≥65 years	21	18	17	30

2.6. IRB Status

The research protocol was approved by both the Catawba Valley Medical Center Institutional Review Board #1-CVIRB and the University of North Carolina at Charlotte Institutional Review Board. Informed consent was waived because the retrospective data were deidentified by alphanumeric coding and were aggregately analyzed.

3. Results

3.1. Occurrence, fall rates, and injury fall rates

The number of psychiatric and medical falls was 62 and 25, respectively, during Phase I, while 42 psychiatric falls and 53 medical falls were reported in Phase II (Table 1). This represents a 32% decrease in psychiatric inpatient falls, whereas medical falls increased 112% between phases.

Fall rates and injury rates for both patient populations in the two phases of the study are depicted in Fig. 1. The

psychiatry fall rate decreased between Phase I (7.97) and Phase II (5.09). Likewise, the psychiatric fall injury rate diminished (Phase I = 4.11, Phase II = 1.45). Conversely, the fall rate and fall injury rate doubled in Phase II compared to these rates in Phase I for general medicine inpatients.

3.2. Gender, age, and mental status

During the study period, more females incurred falls than did males in both patient populations (Table 1). However, the frequency approached 70% among female psychiatric inpatients. Chi-square analysis demonstrated that the disproportionate number of psychiatric falls involving females was significant at $p < .001$. Because of this gender disparity, patient admissions were investigated. The psychiatry female and male admission rates were quite similar in both phases (Phase I = 51% females, 49% males; Phase II = 51% females, 49% males), and approximated the general population's adult gender distribution. Although male/female medical admissions in both phases were similar, a higher percentage of females were admitted to the medical unit during the study interval (Phase I = 58% females, 42% males; Phase II = 59% females, 41% males).

Mean ages for inpatients who fell are shown in Table 1. The mean age in years of psychiatric patients was 59.34 (Phase I) and 58.21 (Phase II), whereas medical patient mean age was substantially older. With the medical service admitting a greater number of geriatric patients (58.18%) than the psychiatric service (8.25%) during the study period, fall occurrences were subset analyzed by geriatric (age ≥65 years) and nongeriatric status (age <65 years). Most medical falls involved geriatric inpatients, whereas 60% or more of the psychiatric falls occurred among nongeriatric inpatients (Table 1). The distinct age pattern frequencies of patients who fell within the two patient populations held true for both phases of the study.

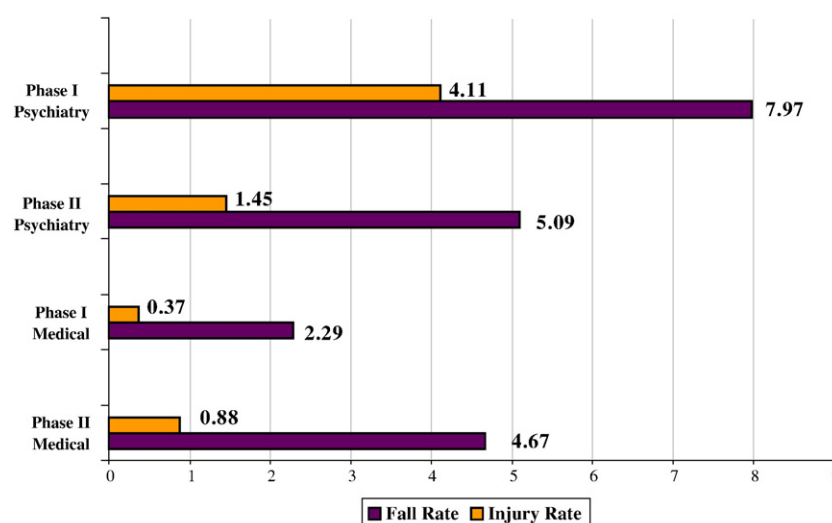


Fig. 1. Fall rates and fall injury rates for psychiatric and medical inpatients during Phase I and Phase II of the study.

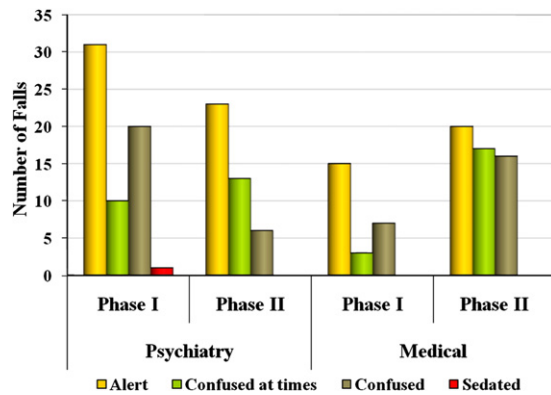


Fig. 2. Mental status of psychiatric and medical inpatients involved in falls during Phases I and II.

Mental status (alert, confused at times, confused, or sedated) was assessed for each inpatient by a registered nurse and was reported in the FET. The MFS addresses mental status by categorizing the patient as either forgetful or oriented. In Fig. 2, it is evident that large numbers of patients who fell in this acute care setting were alert. When comparing data between the study phases, fewer psychiatric falls occurred for all mental states except confused at times in Phase II. On the contrary, an increase in Phase II medical patient falls for each mental status category except sedated was observed (Fig. 2).

3.3. Fall type and injury severity

MFS (Morse, 1997) assessment of patient fall risk is conducted on admission, every 12 hours thereafter, upon

Table 2
Definitions for each fall type and injury severity classification

Category	Definition
Fall Type classification	
Accidental ^a	Falls caused by patients slipping, tripping, or having some other mishap.
Anticipated physiological ^a	Falls that occur with patients identified as fall-prone by scoring “at risk of falling” on the MFS.
Unanticipated physiological ^a	Falls that may be attributed to physiological causes but are created by conditions that cannot be predicted before the first occurrence.
Saved	A successfully prevented fall, i.e., patient is “caught” and lowered to a chair or the floor breaking the impact of the fall.
Fall Injury classifications	
No injury ^a	No evidence of abrasion or bruising and no complaint of pain after fall.
Minor ^a	Any bruise or abrasion not requiring medical treatment that will heal in several days.
Moderate ^a	Injury requiring medical treatment not considered major: cut requiring sutures, contusions or sprains requiring treatment, suspected bone injury that x-ray reveals no fracture.
Major ^a	A serious injury: any bone fracture, head injury, or wound requiring major suturing.

^a Morse (1997).

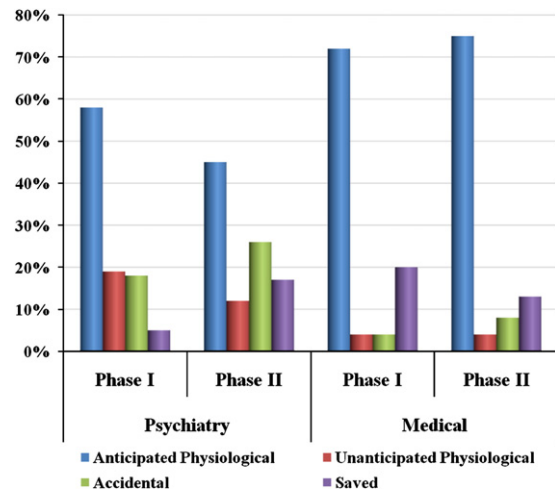


Fig. 3. Type of falls occurring in both phases in psychiatric and medical inpatients.

change in condition, transfer to another unit, and following a fall occurrence. The Policy also recognizes four categories of fall types: anticipated physiological, unanticipated physiological, accidental, and saved (Table 2). The first three fall types are standardized classifications according to Morse (1997). Saved falls have been recognized at this acute care hospital only since implementation of the 2006 revised Policy.

Fig. 3 depicts Phases I and II fall occurrence comparisons. Psychiatry realized decreases in anticipated physiological (16%) and unanticipated physiological (8%) falls, and increases in accidental (8%) and saved (13%) falls in Phase II. Anticipated physiological and accidental falls increased among medical patients, whereas unanticipated physiological falls remained the same. Fewer saved falls were reported in Phase II as compared with Phase I medical fall occurrences.

Inpatient falls were also examined for any injuries incurred. Severity of injury was classified, according to Morse (1997), into one of four categories: no injury, minor injury, moderate injury, and major injury (Table 2). The data revealed that psychiatry patients had no resulting injury in 72% of the fall cases identified, and there was no injury postfall among 81% of the medical inpatient falls in Phase II (Fig. 4), representing an improvement for the Psychiatry Service and a small decline for the General Medicine Unit. Psychiatry experienced a reduced number of both minor and moderate injuries postfall in the second phase of the study, whereas medical showed an increase in these injury categories (Fig. 4). Major injuries disappeared completely in the medical population during Phase II; however, this was not the case for the psychiatry population. Chi-squared analyses of fall type and injury severity were performed to determine if significant differences existed between the two populations within each study phase and between the Phases I and II for each patient population (Table 3). Significant differences were found when comparing psychiatric and

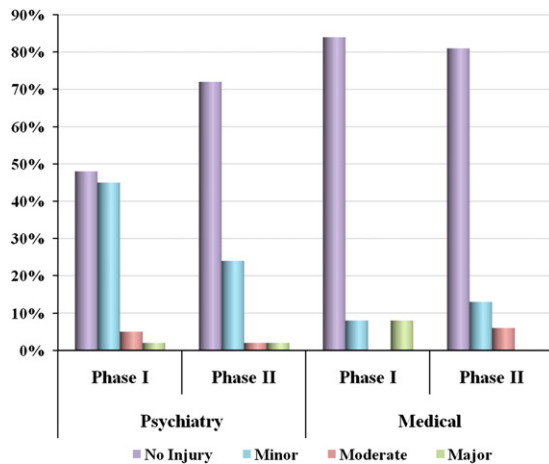


Fig. 4. Type of injury incurred by psychiatric and medical inpatients who fell during Phase I and Phase II of the study.

medical types of fall ($p < .001$) and injury severities ($p < .001$) in Phase I. Inferential analysis of Phase II types of fall incidences revealed significantly different distributions ($p = .007$) between medical and psychiatric falls, although there was no significant difference between the injury types found ($p = .184$). However, all Phase I versus Phase II comparisons of fall types and injury severities for psychiatric and medical falls revealed statistical significance.

Regression analysis using the variables (gender, age, mental status, and fall type) to predict injury severity revealed that age ($p = .0362$) played a role in psychiatric injury during Phase I of the study, that is, 75% of moderate and major injuries were incurred by geriatric patients. No associations were found among the variables in regression analysis of medical falls. Also, age and mental status of psychiatric patients who fell were weakly correlated ($r^2 = .642$). No geriatric patients who fell were assessed as alert, whereas 66% of nongeriatric patient fallers were alert. In Phase II, the age of medical inpatients that fell was a factor for injury severity ($p = .049$). Of the minor and moderate medical injuries, 90% were incurred by geriatric patients. However, regression analysis did not show any relationship between gender, age, mental status, and type of fall in predicting injury severity for Phase II psychiatric falls.

Table 3

Chi-square analysis of fall occurrences within Phase I and within Phase II and between Phases I and II for psychiatric patients and medical patients

Phase and population comparison	Type of fall, χ^2	Type of fall, p	Injury severity, χ^2	Injury severity, p
Phase I psychiatry falls versus medical falls	24.14	<.001	27.45	<.001
Phase II psychiatry falls versus medical falls	12.03	.007	4.84	.184
Phase I versus Phase II psychiatry falls	9.74	.021	9.53	.023
Phase I versus Phase II medical falls	10.81	.013	15.34	.002

3.4. Fall-associated factors related to fall prevention interventions

Upon review of the fall data, it was discovered that adherence to certain fall interventions was inconsistent. Nonskid gripper socks or other proper footwear should be applied to every patient. During Phase II, nonskid gripper socks were not worn by 4 of the 42 psychiatric patients who fell; unfortunately, 27 of the 53 medical patients who fell were not wearing appropriate footwear as dictated by the Policy (Table 4). Medication profiles must be reviewed on all identified high fall risk patients according to the 2006 revised Policy; yet, more than 50% of the medical patients who fell and were identified as being at high risk for falls did not have their medication profiles reviewed. Medical beds are outfitted with bed exit alarms in contrast to the facility's psychiatric beds, which are not. Where falls occurred with medical inpatients getting into or out of bed, exit alarms were not engaged in 15 of these instances. Failure to complete patient and/or family fall prevention education was more common among falls involving medical patients. Other fall prevention intervention inconsistencies are shown in Table 4. However, certain fall interventions were found to be consistently performed. In almost all falls identified, the bed was in low position, the call bell was within reach, and only two to three side rails were utilized when the patient was in a bed or on a stretcher.

3.5. Nursing staff awareness of fall prevention policy revisions

Nurses and nursing assistants were queried anonymously with regard to interventions in the revised 2006 Policy. Reviewing fall prevention information or the available brochure with patients on admission was not the practice of greater than 48% of survey respondents. Signs for transporting patients and patient education were reported as being utilized the least when compared with bed exit alarms, red dots on patient bracelets, and high fall risk signs in patient rooms. Seventy-two percent of nursing staff reported that Posey® Sitter Select devices were either very

Table 4

Phase II noncompliance with fall prevention interventions

Fall prevention intervention noncompliance	Psychiatry <i>n</i> = 42	Medical <i>n</i> = 53
Nonskid gripper socks ^a not utilized	4	27
Patient care items not within reach	1	2
Fall risk not indicated on chart	1	3
Risk level signs not used in rooms	0	3
Patient/Family education ^a not completed	2	6
Fall risk assessment not completed within 12 hours	4	0
Bed exit alarm ^b not utilized	NA ^c	15
Medication profile review ^{a,b} for medications contributing to fall risk not completed	8	32

^a New fall prevention interventions after Policy revisions in 2006.

^b Applicable to high-risk patients.

^c Not applicable; facility's psychiatric beds do not have bed exit alarms.

Table 5
Nursing staff anonymous suggestions and recommendations

Thematic category	Specific suggestions
Education	<ul style="list-style-type: none"> • Remind staff of interventions • Continuous staff education^a • Unit-specific education^a • Provide more in-services/demonstrations^a • Hold staff more accountable^a • Make rounds on a routine basis to check interventions^b
Equipment	<ul style="list-style-type: none"> • More Posey® Sitter Select devices^a • Utilize more Posey® Chair Pad Sensor^a • More activity aprons for demented patients • Taller toilet seats for geriatric clients
Signage	<ul style="list-style-type: none"> • Change the look of the high fall risk sign • More signs available^a
Staffing/Sitters	<ul style="list-style-type: none"> • Increase staffing • Provide sitters^a

^a Suggestions that have been implemented as a result of study.

^b Housewide rounding evidence-based practice initiative began in May 2009.

helpful or moderately helpful. Most of the respondents (97%) indicated the nonskid gripper socks were effective in preventing patient falls. Finally, participants were provided a comment box on the electronic questionnaire in which to make suggestions and/or recommendations for the FPC. Comments were categorized into four thematic categories (Table 5). The most frequently recurring suggestions were to alter or update the high fall risk sign, offer continuous staff education, provide sitters or more staffing for high fall risk patients, purchase additional Posey® Sitter Select devices, and hold staff more accountable.

4. Discussion

A great deal of published fall research has focused on older adults and validating various risk assessment tools. Typically, the psychiatry patient population has been excluded. The reality is that psychiatric patients also fall while hospitalized as this research demonstrates. Nongeriatric patients fell in both populations; however, most psychiatric inpatients who incurred falls were less than 65 years old. The converse was true of general medicine patients. Although admission rates of males and females were similar during the study interval, many more females than males fell while hospitalized in the psychiatry department at the facility. The disproportionate gender distribution among psychiatric patients who fell is thus enigmatic. Further research is required to delineate the factors that contribute to this finding, for example, examination of medication profiles and body mass index differences between psychiatric males and females who incurred falls.

The data herein revealed a number of intriguing findings regarding patient falls, fall prevention interventions, and staff knowledge. The dramatic increase in medical patient falls

and decrease in psychiatric patient falls between Phase I and Phase II were unexpected. The typical psychiatric patient is up during the day and freely ambulating, whereas a typical medical patient may be in bed most of the day and during the majority of their hospital stay, making the converse result expected. Phenomena that likely contributed to this unexpected finding include mental status of the patients who fell and staff adherence to fall prevention interventions. In Phase I, psychiatric and medical patient fallers were reported as having an alert mental status the majority of the time. Although, in Phase II of the study, most psychiatry patients who fell were reported as being alert, whereas medical inpatient fallers were more equally distributed among the alert, confused at times, and confused categories. Mental status was assessed by the patient's registered nurse during routine physical assessment and is a subjective component that varies between practitioners much like other assessment components.

The increase in Phase II medical falls and injurious falls cannot be attributed to census. Rate calculations (fall rate and injurious fall rate) take into account patient census and ADC in both phases varied by less than one patient. The increased number of psychiatric saved falls and decrease in medical saved falls may be due to a change in the number of fall occurrences that were preventable (rise or fall) or a change in the reporting of these events. Nonetheless, the hospital instituted reporting of saved falls during the last half of the Phase I. Every month of Phase II was subject to reporting saved falls; thus, the opportunity for reporting these events was twice that of Phase I. Logically, one would expect an increase in reporting saved falls in both patient populations over the 12-month period of Phase II. On the other hand, the increase in total number of medical falls during Phase II may have been due solely to increased reporting of fall events among the medical unit nursing staff following the renewed emphasis on fall prevention. This would not explain the concomitant decrease in falls among psychiatric patients though.

Other interesting findings include the type of fall and injury severity associated with the falls that occurred during the study phases. In psychiatry, anticipated physiological and unanticipated physiological falls both decreased between Phase I and Phase II. In this department, there was also a noted decrease in the minor and moderate injuries. One assumption could be that interventions were more routinely utilized to prevent falls and injuries associated with those falls. The medical unit had an increase in anticipated physiological and accidental falls between study phases, which could have contributed to the increase in minor and moderate injuries observed between Phases I and II.

A drawback in existent published research is the lack of research addressing effectiveness of and compliance with fall prevention interventions in the acute care setting. Once the risk factors have been identified and prevention measures have been implemented, investigating the fall prevention measures performed or not performed in each patient fall can

provide valuable information for preventing future falls and injuries.

In more than half of the medical inpatient fall cases during Phase II, nonskid gripper socks were not used, yet most nurses and nursing assistants responding to the survey indicated these were helpful in preventing patient falls. It is prudent to take into consideration patient compliance of wearing nonskid gripper socks because this may be an issue; unfortunately, such could not be determined by medical chart review. The lack of bed exit alarm use in the applicable medical fall cases (patients were in the bed just prior to the fall) is disconcerting. A parallel comparison with the psychiatric patient population was not possible, as psychiatry beds in this facility do not have the bed exit alarm option. However, the psychiatric department places high fall risk patients in one of the eight video-monitored rooms if available or close to the nursing station for constant observation.

Moreover, failure to review patient medication profiles for high fall risk patients may have been a factor in the escalation of medical falls noted in Phase II of the study. Certain medications and polymedication interactions can have a substantial impact on gait, balance, and orientation, and although the MFS has no direct assessment category for medication usage, the 2006 revised Policy includes this intervention. Because of the range of diagnoses that can be present in both patient populations, it was not within the scope of this study to investigate the contribution of specific diagnoses to fall prevalence.

The use of two to three side rails was evident in most of the falls identified in both patient populations. Four side rails are considered a restraint, and in no fall occurrence examined were four side rails up found. This is a marked improvement for nursing, in itself, as restraints and side rails were, by history, a first-line choice in preventing patient falls.

5. Conclusions

Overall, this research has been beneficial to the organization in evaluating inpatient falls in two distinct service areas in the acute care setting. The nursing staff survey elicited recommendations appropriate for consideration by the Falls Prevention Committee. The survey responses allowed the FPC to determine respondent staff knowledge and provided insight and direction for improving patient safety. Fall prevention education was expanded to include (a) demonstrations on how to use Posey® Sitter

Select devices, (b) hospital orientation for new employees, (c) establishing a nursing staff requirement for annual Policy competency, and (d) fall prevention education offered to employees from multiple hospital services including non-clinical staff. As a result of staff recommendations, additional fall signs, Posey® Sitter Select devices and Posey® Chair Pad Sensor were made available.

Since completion of the study, the General Medicine Unit has incorporated Patient Safety Attendants, that is, sitters, to assist with monitoring high fall risk patients. Routine rounding by nursing and nursing assistants was piloted on two inpatient service areas to evaluate the effectiveness of patient rounding in reducing falls. Following success with the pilots, a housewide rounding evidence-based practice initiative was begun and continues. Improved patient safety remains the end goal.

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