

ORIGINAL ARTICLE

Decreasing inpatient falls: A retrospective analysis with clinical nurse specialist-led interventions

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Abstract

Objective: To identify and analyze associations between characteristics and factors collected on the 'Post Fall Huddle/Event Report' form used by Nursing and Risk Management for all inpatient falls. Inpatient falls were defined as any hospitalized patient that had a fall event during their stay.

Methods and materials: All inpatient falls, 17 years and older, were included within a six month period for a sample size of 182. SPSS was used for analyses to identify associative predictors.

Results: When examining the number of inpatient falls post implementation of the form, the average annual number of inpatient falls decreased by 50%. Several strategies implemented by Clinical Nurse Specialists to be continued include in-depth review of circumstances surrounding the fall; education of staff for consistency in the fall protocol; and reinforcement of purposeful hourly rounding.

Conclusions: Suggested associations with injury or increased length of stay included patients with elimination problems, on antihypertensive medications, a higher patient census at the time of the fall on the unit, and any other medication changes. Further revisions continue to increase the objectivity on the 'Post Fall Huddle/Event Report' form.

Key words

Inpatient falls, Contributing factors, Fall risk, Hospital fall programs, Fall risk factors, Clinical Nurse Specialist interventions

1 Introduction

For decades inpatient fall events have been targeted as a problem in hospitals. In 2002, the Nursing Quality Forum (NQF) published a list of "Serious Reportable Events". In 2006 the NQF update identified 28 'preventable events' including patient falls^[1]. Basic categories include: 1) procedures involving surgery or invasive interventions, 2) events of incorrect use of devices or products, 3) environmental concerns impacting safety of staff and patients, 4) criminal actions, and 5) safety issues, such as falls, resulting in serious injury or death. Inpatient falls can increase length of stay, costs, and lead to negative outcomes such as injuries, devastating physical effects, disability, and even death. Performance improvement efforts for reducing inpatient fall events have become a primary focus in national and international hospitals as they work

in concert with regulatory bodies mandating improvement efforts surrounding standards of care and reimbursement provisions.

Table 1. Post Fall Huddle/Event Report Form

Unit: _____

Date/time fall occurred: _____

Date/time fall reported: _____

The purpose of this tool is to heighten staff awareness in reviewing falls to help reduce the rate of falls and fall related injuries. Please take no more than 10 minutes to complete this tool

TYPE of FALL: [Mark one and circle the specific reason if known]

Accidental: Fall due to extrinsic environmental risk factors re: spill on floor, clutter, tubing/cords on floor, slippery floor, etc.*

Anticipated Physiological: Factors associated with known risks from assessments re: impaired gait/mobility, impaired cognition/confusion, impaired vision, history of recent falls, etc.*

Unanticipated Physiological: Factors associated with unknown fall risks that were not predicted on risk fall assessment re: unexpected orthostasis, extreme hypoglycemia, stroke, heart attack, etc.*

Intentional: Patient voluntarily positions his/her body from a higher level to a lower level i.e. bed to floor.

Assisted: Patient was physically assisted to the floor by a staff member.

1. In the patient's own words, what was he/she doing at the time of the fall?

2. Location of the fall:

Bedside Patient's room Bathroom Hallway

3. What was the patient's fall risk assessment prior to the fall event?

Low Moderate High

4. If high risk to fall was documented, does the patient have:

a. Yellow wrist band Yes No

b. Yellow socks Yes No

c. Fall magnet Yes No

5. Was anyone with the patient at the time of the fall?

RN C.N.A. Family/Visitor Ancillary Staff _____

6. Was the call bell within reach? Yes No

7. Was the call light on at the time of the fall? Yes No

8. Was the patient trying to go to the bathroom? Yes No

9. Is the patient incontinent? Yes No

10. What other interventions were in place at the time of the fall?

Sitter Bed Alarm Close to nurse's station Bed low/locked

11. Check any of the physical hazards found in the room:

Wet floor Cluttered furniture Inadequate lighting Other _____

12. Check any of these medications the patient is taking:

If checked please contact pharmacy to review medications

Sedatives Narcotics Diuretics Antihypertensives Other _____

*adopted from Morse, J. (2009). Preventing Patient Falls; Establishing a Fall Prevention Program. *Creating a Fall Introduction Program: An Overview* (pp. 3-23). New York: Springer Publishing Company.

13. What do you see as the contributing factors:

Medications Equipment Footwear Environment Cognition

Impulsive Behavior Elimination Hazards Other _____

14. Was staffing adequate at the time of the event? Yes No (manager to review)

15. Last completed shift assessment?

16. What bed was the patient in? versa care bed other (please specify) _____

17. What interventions are now in place to prevent this patient from falling again?

Bed low/locked Patient/Family involved in care plan

Call bell within reach Bed Alarm

Increased level of observation Patient close to nurse's station

Fall alert identifiers (band, magnet, socks)

<p>INITIAL PATIENT OUTCOME:</p> <p><input type="checkbox"/> no injury <input type="checkbox"/> fracture</p> <p><input type="checkbox"/> abrasion <input type="checkbox"/> loss of consciousness</p> <p><input type="checkbox"/> laceration <input type="checkbox"/> skin tear</p> <p><input type="checkbox"/> contusion <input type="checkbox"/> sprain</p> <p><input type="checkbox"/> other _____</p> <p><input type="checkbox"/> transfer to higher level of care</p>	<p>TREATMENT/INTERVENTIONS</p> <p><input type="checkbox"/> no treatment/interventions</p> <p><input type="checkbox"/> ice</p> <p><input type="checkbox"/> sutures</p> <p><input type="checkbox"/> x-ray/ct scan/MRI</p> <p><input type="checkbox"/> changes in medications</p> <p><input type="checkbox"/> other _____</p>
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ACTIONS TAKEN:

If patient is injured phone Risk Management at ext 3842. Leave message to include patient's name, DOB and injury

Notified physician/family and documented in nurses notes

Shift assessment, vital signs and fall risk assessment completed post falls

Updated patient's plan of care

Placed event on the units quality tracking calendar.

Completed the units "Patient Safety and Clinical Quality" tracking form located on your unit.

Forward completed report to the units Clinical Nurse Specialist

Huddle Participant Names:

Primary Nurse _____ Charge Nurse _____

House Supervisor _____ Primary C.N.A. _____

Other _____ Other _____

Rev: 03/08/11

In 2007 The Joint Commission (TJC) in the United States (U.S.) highlighted the need to reduce injuries from falls. They required hospitals to implement fall prevention programs and to evaluate the effectiveness of their programs [2]. In 2008,

the Centers for Medicare and Medicaid Services [CMS] ^[3] disclosed ten hospital acquired categories, or conditions, associated with payment provisions. Falls with injury was one of those categories. With the implementation of 'never events' surrounding the Patient Safety Goals, CMS established specific criteria for events that may be considered non-reimbursable. Events included extended stays or other costs due to injuries incurred from a fall while hospitalized. Hospitals are acutely aware of the mandates to develop and implement fall prevention programs, especially considering both patient safety and financial incentives are associated with quality based reimbursement. To remain viable as a healthcare provider in the community, preventing falls and other never-events is crucial.

Studies of patient populations from a variety of medical specialties in the acute care settings have evaluated risk factors for falls focusing largely on the geriatric population. Falls in the 65 and older group have been found to be a leading cause of death ^[4]. Other studies, though few, have focused on all ages or the spectrum of adult age ranges starting at 17 to 18 years of age. Many descriptive, retrospective, and prospective studies report activities related to elimination as a common contributing factor to inpatient fall events ^[5-7]. Further, the role of medication use/polypharmacy is also well documented as being an independent risk factor for fall events; especially in the geriatric population in both the inpatient and outpatient arenas ^[8-11]. Additionally, studies have described the relationship between altered cognition and patient falls in a variety of settings ^[12-16]. Altered mobility has been identified as another contributing risk factor for inpatient falls ^[13, 16, 17]. Considering the lack of comprehensive inpatient fall evaluations in the literature, the purpose of this study was to evaluate and describe analyzed characteristics, attributes, and factors specifically related to inpatient fall events in order to identify and develop targeted improvement strategies.

A strategy facilities use to benchmark patient fall rates include participation in the National Database of Nursing Quality Indicators (NDNQI) ^[18]. Prior to this study it was suspected that not all events were being reported by frontline staff. Possible causes included lack of knowledge regarding fall types and what constituted a fall based on NDNQI definitions. To address this issue the team's initial work involved Clinical Nurse Specialists (CNSs) centered on the creation of a 'Post Fall Huddle/Event Report' form (Table 1). This tool was intended to: 1) ensure all fall events were reported consistently, 2) require a staff 'huddle' so information related to the fall event could be captured immediately to include several perspectives, 3) standardize definitions of fall types, 4) collect data for analysis of fall events, 5) standardize the process for communicating fall events, and 6) raise awareness regarding inpatient falls in an effort to ultimately reduce fall events. The strengths of the CNSs within the team were their preparation at the graduate level with expert knowledge and leadership skills in patient care for specific patient population aggregates ^[19]. CNSs in the study hospital follow the National Association of Clinical Nurse Specialists standards. Their focus is on three major areas; which include Clinical Quality, Patient Safety, and Professional/Educational development of the nursing staff. In this study the CNSs collaborated with staff nurses on the Nursing Quality, Nurse Managers, Risk Management, and Performance Improvement Councils to develop strategies to reduce the frequency of falls.

2 Methodology

The study described in this article was a retrospective exploratory analysis of secondary data collected from the 'Post Fall Huddle/Event Report' form developed by and implemented with guidance from the CNS team. The goal was to capture data points or attributes and contributing factors observed with this population. This form also served as the hospital's event report form for all inpatient falls. A major benefit in using this form was it collected necessary data for risk management and for required nursing documentation.

Institutional Review Board approval was obtained from the hospital. Inclusion criteria consisted of all inpatient fall events over a six month period between January and June 2011 (N=182). If a patient fell more than once during a hospitalization, each fall was counted as an individual event. Exclusion criteria were falls of outpatients, visitors, hospital staff, and patients younger than 17 years of age who were admitted to the adult inpatient units. A patient fall event was defined as an unplanned descent to the floor with or without injury to the patient and included both assisted and unassisted falls ^[19].

Development and implementation of the form

The initial role out of the 'Post Fall Huddle/Event Report' form involved the team of CNSs working with staff during a four-month trial period using the new form prior to January 2011. Data were collected during the trial period and further work with the team focused on refining the report form. After a detailed review of the findings and feedback from experts in the field (with further input for face validity of the form); modifications were made to add definitions for increased clarity and improvement of consistent interpretation and objectivity. These steps were particularly important to validate the information collected to be as objective as possible for the staff nurses.

Following the implementation of the form after the trial period, when a fall event occurred the staff nurses would call a 'huddle' with the nursing assistant and charge nurse to complete the 'Post Fall Huddle/Event Report' form. This procedure allowed the team to gain multiple perspectives surrounding the fall event. Upon completing the forms, the next step was for the CNSs to review then forward to the hospital's risk management department. Once received, the Risk Management Data Coordinator entered the data into the data repository system in the hospital. All attributes/variables from the form were downloaded into an Excel file spreadsheet and then matched across time to each specific patient. For the study, confirmed data were cleaned, re-coded, and patient identifiers were removed. Next, the data were uploaded into SPSS version 19. Explanations and definitions for staff of all of the attributes were included in the 'Post Fall Huddle/Event Report' (Table 1).

Table 2. Contributing Factors Related to Patient Falls-Demographics and Characteristics of Patient Falls (N=182)

Demographic Characteristics	N	Percent
Hazards Found in Room		
Wet Floor	5	2.7
Cluttered Furniture	3	1.6
Inadequate Lighting	6	3.3
Other	16	8.8
Patient Medications		
Sedatives	37	20.3
Narcotics	51	28
Diuretics	18	9.9
Antihypertensives	42	23.1
Other	33	18.1
Contributing Factors		
Medications	29	15.9
Equipment	13	7.1
Footwear	14	7.7
Environment	11	6
Cognition	79	43.4
Impulsive Behavior	84	46.2
Elimination	30	16.5
Hazards	1	.5
Other	49	26.9
Attempting to use Bathroom	81	44.5
Patient Incontinent	45	24.7

The type of fall categories of accidental, anticipated physiological, and unanticipated physiological were based on the definitions provided by Morse ^[20]. The attributes of intentional or assisted by staff or family members were also included. Several other attributes collected included variables such as incontinence/elimination issues, medication types, subsequent

injuries, length of stay, unit and place of fall, co-morbidities as well as demographic data of age and gender. Sections of the form included contributing factors (CF), fall type (FT), and a universal identification (UID). Data were examined with frequencies, 't' tests, Pearson correlations, cross tabs, frequencies, and multiple and logistic regression models.

3 Results

Of the 182 fall events the mean age was 65. The gender makeup was 43% males and 57% females. The two most reported fall types were 58% anticipated and 10% unanticipated with injuries occurring in approximately 40% of the cases. Upon further analysis, elimination (16.7%) and incontinence of urine (24.7%) were identified as two related attributes reported by the nurses. These two factors combined were approximately 44% and for the elimination it was potentially interpreted that the patient was attempting to use the bathroom when they fell. Therefore, both elimination and incontinence appeared to be directly related; or possibly interpreted as the same concept by the staff. Another reported potential contributor to the falls was impulsive behavior at 46%. Impulsive behavior was in the category of 'cognition' as was elimination and incontinence (Table 2). Admitting diagnosis and mortality and morbidity were examined. They were not significantly associated with the any of the variables on the form, or the outcomes of length of stay or injury. There were no significant statistical associations found with the shift in the 24-hour period, unit where the fall took place, or the day of the week.

3.1 Descriptive analysis

Descriptive statistics found nearly 60% of the falls resulted in no injuries, while the remaining 40% with injuries included skin tears, abrasions, lacerations, contusions, fractures, loss of consciousness, and sprains. Abrasions were identified as the highest occurrence of injury at 11% with the most frequently selected intervention post-injury listed as 'other' at 23%. The next most frequent intervention was radiological exams at approximately 11% (Table 3). No deaths resulted from the falls.

Table 3. Post-Fall Patient Outcomes and Treatments

	N	Percent
Patient Outcomes		
No Injury	125	59.9
Abrasion	25	11
Laceration	11	6
Contusion	13	6.6
Fracture	3	1.6
Loss of Consciousness	0	0
Skin Tear	19	9.9
Sprain	0	0
Transfer to Higher Level of Care	0	0
Other	32	15.4
Treatment		
None	105	50
Ice	20	10
Sutures	1	0
Xray/CT/MRI	32	15
Change in Meds	1	0
Other	48	23

3.2 Regression analyses

Logistic regression identified possible predictive associations on the outcome of injury. Risk of falls were measured at high, moderate or low. Sixty seven percent were categorized as high risk, 23.6% as moderate, and 4.9% as low risk. Yet

only the patients categorized as moderate risk prior to the fall event were statistically significant with a $p < 0.05$ and odds ratio suggesting these patients were 3.858 times more likely to be injured. Patients wearing a yellow fall risk wristband were 3.098 times more likely to be injured. If patients were medicated with antihypertensive medication they were 5.211 times more likely to be injured.

3.3 Length of stay

Multiple regression analysis was performed to determine associations between the attributes/contributing factors and length of stay (LOS). Staffing and the census at the time of the fall were noted to impact LOS. The two variables of measure for staff were number of RNs and number of certified nursing assistants that were on duty at the time of the falls. The number of RNs on duty did not statistically impact the LOS however the number of Certified Nursing Assistants (CNAs) were associated with LOS with B of -3.722 , $t = -4.252$ and the significance at $p < 0.01$. Even though the numbers of CNAs present were statistically significant, the ExpB at 0.024 indicated no real appreciative association to length of stay. An association was noted however, with census on the unit at the time of the fall. The higher the census on the unit at the time of the fall suggested the more likely a longer hospital stay (odds ratio 1.5 times more likely). As discussed previously incontinence and elimination within the form potentially could have overlapped or subjectively interpreted by the staff differently than intended. Statistically in this study, incontinence and impulsive behavior increased the likelihood of the LOS and incontinence was significant for the potential for injury however, impulsive behavior was not. Elimination was not statistically significant in either regression model. In reviewing the results with regression analyses even though impulsive behavior was at 46% it was not significant in the regression models for outcomes of length of stay or injury.

4 Discussion

The purpose of this study was to describe and analyze characteristics specifically related to inpatient fall events in order to identify and develop targeted improvement strategies. The CNS team collaborated with Risk Management, Performance Improvement and Nursing Leadership to develop a Post Fall Huddle/Event Report form to identify attributes/contributing factors for falls. This form was initially developed with intensive expert review then monitored and evaluated after a trial period of use. The CNSs were charged with educating the staff throughout the inpatient units in the hospital and then rolling out the implementation of the new form to collect data of each event. Strategies developed to obtain more objective data was that CNSs worked with the staff systematically investigating the circumstances surrounding the fall and disseminated their findings as 'lessons learned'. For each fall event, the CNS developed a situation, background, assessment, recommendation (SBAR) communication email immediately sent to all nursing staff on the department where the fall occurred, the CNS team, nursing management, and the Nursing Quality Council. This communication strategy was developed to emphasize the frequency of fall events and to assist others with learning from the event to prevent similar situations from occurring.

The CNSs also realized that some of the attributes within the categories could have overlapped which contributed to the potential for subjectivity by the nursing staff. Examples of overlap or unclear parameters included the variables listed under the category cognition. The variables of impulsive behavior, elimination, and even incontinence could have been interconnected as to the driver behind the fall episode. Staff often selected impulsive behavior for patients who did not seek staff assistance prior to attempting to get out of bed. While it was identified 46.7% of time as a contributing factor and significantly associated with LOS, it was determined to be more subjective than objective. This contributing factor should be further evaluated and defined to determine the relationship objectively to the outcomes of injury and LOS.

Elimination was noted in the literature to be significantly related to falls ^[5-7]. The concept of elimination includes the action necessary to control elimination of urine and bowels and thus the outcome can be related directly to incontinence. Those patients that were identified as incontinent were likely attempting to get to the bathroom (approximately 44%) to prevent an episode of incontinence. When considering that impulsive behavior could be a response to the need for

elimination the outcomes of all three factors could have resulted in difficulty to statistically recognize the associations more readily with the fall event.

Reviewing the descriptive data included compliance with staff-related interventions with the high-risk fall protocol at the time of the study. According to the data, staff compliance with the high risk protocol included; yellow wrist band (71%), yellow socks (61%), and a fall magnet outside the patients room (73%). Staff was required to implement certain interventions for high risk patients in which compliance also seemed to be deficient. The bed alarm was only used 18% of the time. Twenty percent of the high-risk patients were in rooms close to the nurses' station and 82% of the patients had general safety measures enforced; such as their bed low and locked or their call bell within reach. Overall, data indicated a global lack of consistency in staff compliance with the proposed protocol which was ultimately addressed as a result of this study.

In terms of the results of this study, the use of the yellow bands indicated patients were 3.089 times more likely to be injured when they fell. Therefore, the identification with the yellow band did highlight the recognition from the staff of the higher risk of falling and could have implications of those falls resulting in injuries. Yet, when considering low, moderate, or high risks, those identified as moderate risk were 3.858 times more likely to be injured with the fall. The question to consider is why they were more likely as opposed to those identified as high risk. The potential for subjectivity by the staff could have been the factor in their interpretation of low, moderate, and high risk.

Even though the outcomes of this study reflect needs to decrease the subjectively of the form much has been accomplished based on the trial period, definitions of terms, and support by the CNS team. It is clear that the use of the form requires education and support from the CNSs which made the difference in capturing the data more consistently and comprehensively than prior to the use of this new form. With the implementation of the 'Post Fall Huddle/Event Report' form, there was an increase in the overall number of fall events reported and the quality of data collection improved dramatically.

In this study, the most prevalent ICD9-CM categories for admission diagnoses included circulatory at 74.8%, respiratory at 74.9% and metabolic disorders at 75.5%. Within the hospital, there were eleven units with fall events. Of the units or wards where a fall took place there was no statistically significant difference on outcomes of injury or length of stay. Of concern was that both injury and length of stay were associated with medications. Identified changes in medications (though not listed as to what medications) were associated with an increased length of stay and the use of antihypertensives were associated with the potential for injuries resulting from the fall. Further study is required to ascertain what specific indicators could be examined.

Strengths and limitations

Major limitations of this study included the small sample size of 182 inpatient fall events within one community based hospital and that this was a convenience sample of all falls. The 'Post Fall Huddle/Event Report' form limitations included the subjectively which was not recognized in detail until after the data were collected and analyzed; even though the definitions were included within the form as a result of the trial. The possibility of separating this form into two; such as a 'huddle form' and an 'event report' is a possible solution to this problem; yet further analysis is necessary to determine internal consistency of the present 'Post Fall Huddle/Event Report' form. If dividing into two different forms the first or 'huddle form' would be used as a type of immediate debrief to look at why the fall happened and how a repeat fall could be prevented and second form or 'event report' could be focused on specifics surrounding the event necessary for the hospitals Risk Management Department. However, in this study the significant strength was the amount of detail recovered immediately after the fall event in the Post Fall Huddle/Event Report, which reduced redundant documentation. A definite strength of this study was the direct involvement of the CNSs providing educational support and clinical expertise with the staff and with the investigation of each fall event.

5 Conclusion

The implementation of the new form, 'Post Fall Huddle/Event Report', with the direct involvement of the CNSs provided the opportunity to complete this study. Though it is not possible to generalize the results of this study it could be suggested that other hospitals of like size, demographics, and region may experience similar concerns and findings. The subjectivity of the 'Post Fall Huddle/Event Report' form, in addition to possible differences of staff's interpretations, is a definite limitation. A major strength for this organization was that the creation of the 'Post Huddle/Event Report' elevated the level of awareness and enhanced a culture of safety surrounding hospital fall events throughout this organization. Even with the limitations noted above, the average annual number of inpatient falls decreased by 50% post the implementation of the 'Post Fall Huddle/Event Report' along with an increase in assisted falls (compared with unassisted).

Recommendations

Future research requires investigating specific interventions surrounding risk factors identified in this study, in more detail. With the increased awareness and submission of reported events, the number of falls decreased which can reduce overall costs to the organization.

References

- [1] Nursing Quality Forum. Serious reportable events [Internet]. 2008 [cited 2012 August 15]. Available from: http://www.qualityforum.org/Publications/2008/10/Serious_Reportable_Events.asp x
- [2] The Joint Commission. 2007 national patient safety goals [Internet]. 2007 [cited 2011 September 12]. Available from: http://www.jointcommission.org/standards_information/jcfaqdetails.aspx?StandardsFaqd=201&ProgramId=1
- [3] CMS.Gov. Center for Medicare and Medicaid Services. Hospital acquired conditions [Internet]. 2012 [cited September 12]. Available from: http://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/HospitalAcqCond/Hospital-Acquired_Conditions.html
- [4] Institute for Healthcare Improvement. Fall prevention [Internet]. 2011 [cited 2011 November 1]. Available from: <http://www.ihl.org/explore/Falls/Pages/default.aspx>
- [5] Hitcho E, Krauss M, Birge S, Dunagan C W, Fischer I, Johnson S, et al. Characteristics and circumstances of falls in a hospital setting. *Journal of General Internal Medicine*. 2004; 19: 732-739. PMID:15209586 <http://dx.doi.org/10.1111/j.1525-1497.2004.30387.x>
- [6] Krauss MJ, Nguyen SL, Dunagan WC, Birge S, Constantinou E, Johnson S, et al. Circumstances of patient falls and injuries in 9 hospitals in a Midwestern healthcare system. *Infection Control and Hospital Epidemiology*. 2007; 28(5): 544-550. PMID:17464913 <http://dx.doi.org/10.1086/513725>
- [7] Tzeng H. Understanding the prevalence of inpatient falls associated with toileting in adult acute care settings. *Journal of Nursing Care Quality*. 2009; 25(1): 22-30. PMID:19553863 <http://dx.doi.org/10.1097/NCQ.0b013e3181afa321>
- [8] Walker P, Alrawi A, Mitchel, J, Regal R, Khanderia, U. Medication use as a risk factor for falls among hospitalized elderly patients. *American Journal of Health-System Pharmacy*. 2005; 62(23): 2495-2499. PMID:16303905 <http://dx.doi.org/10.2146/ajhp050116>
- [9] Rhalimi M, Helou R, Jaecker P. Medication use and increased risk of falls in hospitalized elderly patients: A retrospective, case-control study. *Drugs & Aging*. 2009; 26(10): 847-852. PMID:19761277 <http://dx.doi.org/10.2165/11317610-000000000-00000>
- [10] Kojima T, Akishita M, Nakamura T, Nomura K, Ogawa S, Iijima, K, et al. Association of polypharmacy with fall risk among geriatric outpatients. *Geriatrics & Gerontology International*. 2011; 11(4): 438-444. PMID:21545384 <http://dx.doi.org/10.1111/j.1447-0594.2011.00703.x>
- [11] Chang C, Chen M, Tsai C, Ho L, Hsieh H, Chau Y, et al. Medical conditions and medications as risk factors of falls in the inpatient older people: A case-control study. *International Journal of Geriatric Psychiatry*. 2011; 26(6): 602-607. PMID:21480377 <http://dx.doi.org/10.1002/gps.2569>
- [12] Vassallo M, Mallela KS, Williams A, Kwan J, Allen S, & Sharma J. Fall risk factors in elderly patients with cognitive impairment on rehabilitation wards. *Geriatric Gerontology International*. 2009; 9: 41-46. PMID:19260978 <http://dx.doi.org/10.1111/j.1447-0594.2008.00506.x>
- [13] Tzeng H. Inpatient falls in adult acute care setting: influence of patients' mental status. *Journal of Advanced Nursing*. 2010; 66 (8): 1741-1746. PMID:20557384 <http://dx.doi.org/10.1111/j.1365-2648.2010.05343.x>

- [14] Chen X, Nguyen H, Shen Q, & Chan D. Characteristics associated with recurrent falls among the elderly within the age-care wards in a tertiary hospital: The effect of cognitive impairment. *Archives of Gerontology and Geriatrics*. 2011; 53(2): e183-e185. PMID:20875920 <http://dx.doi.org/10.1016/j.archger.2010.08.012>
- [15] Harlein J, Halfens R, Dassen T, & Lahmann NA. Falls in older hospital inpatients and the effect of cognitive impairment: A secondary analysis of prevalence studies. *Journal of Clinical Nursing*. 2010; 20: 175-183. PMID:21158990 <http://dx.doi.org/10.1111/j.1365-2702.2010.03460.x>
- [16] Oliver D, Daly F, Martin F, & McMurdo M. Risk factors and risk assessment tools for falls in hospital inpatients: A systematic review. *Age and Ageing*. 2004; 33: 122-130. PMID:14960426 <http://dx.doi.org/10.1093/ageing/afh017>
- [17] Bradley S, Karani R, McGinn, T, Wisnivesky J. Predictors of serious injury among hospitalized patients evaluated for fall. *Journal of Hospital Medicine*. 2010; 5(2): 63-68. PMID:20104622 <http://dx.doi.org/10.1002/jhm.555>
- [18] National Database of Nursing Quality Indicators [Internet]. Guidelines for data collection and submission and quarterly indicators. P. 60. 2012 [cited 2011 August 15]. Available from: <https://www.nursingquality.org/Default.aspx>
- [19] National Association of Clinical Nurse Specialists. 2d edition. Statement on clinical nurse specialist practice and education; Harrisburg, PA.
- [20] Morse, J. Preventing patient falls: Establishing a fall prevention program. New York: Springer Publishing Company. 2009.
- [21] Ang E, Mordiffi S, Wong, H. Evaluating the use of a targeted multiple intervention strategy in reducing patient falls in an acute care hospital: a randomized controlled trial. *Journal of Advanced Nursing*. 2011; 67(9), 1984-1992. PMID:21507049 <http://dx.doi.org/10.1111/j.1365-2648.2011.05646.x>