

Reducing Falls with Tailored Intervention for Patient Safety on a Neuro Unit

by

Darlene L. Lockard

Under Supervision of

Bridgitte Gourley

Second Reader

Sandra Lucci

A DNP Project Manuscript
Submitted in Partial Fulfillment of the Requirements for the
Doctor of Nursing Practice Degree

School of Nursing, University of Maryland at Baltimore
May 2021

Abstract

Problem & Purpose: Falls on the neuro care unit at a suburban hospital in 2019 averaged 2.4 falls per month. This unit has the second highest fall rate at the medical center. Compared to the National Database of Nursing Quality Indicators for total falls in 2019, the neuro care unit was higher than the benchmark and averaged 2.98 falls per 1000 patient days with the benchmark at 2.95 falls per 1000 patient days. The purpose of this quality improvement project is to implement and evaluate the effectiveness of a Tailored Intervention for Patient Safety toolkit to reduce falls on an adult inpatient neuro care unit. The Tailored Intervention for Patient Safety is a 3 step fall prevention process that includes Universal Fall Precautions that apply to all patients admitted or transferred to the neuro care unit.

Methods: Methods employed for assessing completeness and accuracy of data were done by spot checking audits twice weekly to make sure Tailored Intervention for Patient Safety poster at bedside and handout in admissions folders were properly filled out. This data was analyzed and graphed in a run chart to analyze for trends by looking for runs, shifts, and alternating points that suggest cause variation exists. The hospital provided monthly falls and falls with injury was and calculated using falls per 1000 patient days. This was plotted in a bar graph to compare pre-intervention and post-intervention to ensure completeness and accuracy of the data.

Results: TIPS poster compliance was 90%, with 100% of staff trained. Falls decreased by 67% compared to pre/post-intervention data from 2019 to 2020. Falls with injury decreased by 14% compared to pre/post-intervention data from 2019 to 2020. TIPS handout compliance was 0%.

Conclusions: TIPS adherence reduced falls and falls with injury. This reduces hospital cost and improves patient care.

Introduction

Patient falls in hospitals are often a preventable adverse event that can cause serious injury and increase hospital costs. In 2015, falls translated into direct medical costs for non-fatal and fatal falls at over \$50 billion (Florence et al., 2018). Risk factors for falls include age, gait, balance deficits, depression, neurologic and cognitive impairments, history of falls, and medications (Dykes et al., 2017). Neurological patients with symptoms such as mild motor, sensory or cognitive deficit, and individuals who have had a stroke or are suffering from dementia are at a relatively high risk for falling (Hee-Yoo, Reul-Kim, & Soon-Shin, 2015). Other findings revealed that even neurological diseases not directly connected with gait and balance carry an astonishingly high risk for falls (Homann et al., 2013). A fall prevention toolkit approach including patient education, assessing patients' fall risk, the use of nonskid footwear, chair and bell alarms, medication review, walking aids and signage has shown to reduce falls (Opsahl et al., 2016; O'Neil et al., 2015; and Dykes et al., 2017).

Falls on the neuro care unit (NCU) at a small community hospital in 2019 averaged 2.4 falls per month, and this unit was the second highest fall rate. Compared to the National Database of Nursing Quality Indicators (NDNQI) for total falls in 2019, the NCU unit was higher than the benchmark and averaged 2.98 falls per 1000 patient days with the benchmark at 2.95 falls per 1000 patient days. Falls with injury for 2019, the NCU averaged lower than benchmark with 0.57 per 1000 patient days compared to 0.63 per 1000 patient days.

The purpose of the quality improvement (QI) project was to implement and evaluate the effectiveness of a Tailored Intervention for Patient Safety (TIPS) toolkit in reducing falls on an adult neuro care unit.

Literature Review

Dykes et al. (2010) found that a fall prevention toolkit (FPTK) that tailored fall prevention interventions addressing patients' specific determinants of fall risk decreased falls by 22% over six months. Adherence to using TIPS poster was printed for 93.2% of patients, with 89% adherence with placing poster above the patient's bed. Falls were measured by patient falls per 1000 patient-days in targeted units during the study period. FPTK adherence was measured by random assessment of completed computerized TIPS poster above patient's bed.

Ang et al. (2011) found fall rates decreased from 1.5% control group to 0.4% on intervention group with targeted multiple fall prevention interventions. Falls were calculated with the Wilson method and compared using the Chi square test.

Both of these studies were conducted on an adult inpatient unit and focused on targeted fall prevention interventions specific to the patient's fall risk. Therefore, both studies support the intervention. The level and quality of both of these studies are IIB.

Titler et al. (2016) found fall rates declined from pre-implementation of 3.69 to post-implementation 2.7 with using the Targeted Risk Factor Fall Prevention Bundle, which was a 22% fall rate decrease. Fall rates were calculated by the number of inpatient falls multiplied by 1000 and divided by the total number of inpatient days, fall injury calculated by multiplying the number of inpatient falls with injuries by 1000 and dividing by total number of inpatient days. This study focused on adult inpatient targeted fall prevention interventions specific to the patient's fall risk, and supports the intervention. The level and quality of this study is IVB.

Dykes et al. (2017) found that during the six month pilot study, results showed at Brigham and Woman's Hospital (BWH) the mean fall with injury rate for these periods decreased from 1.00 to 0.54 per 1,000 patient-days. TIPS compliance with using Fall TIPS

averaged 82%. Montefiore Medical Center (MMC), mean fall with injury rate decreased from 0.47 to 0.31 per 1,000 patient-days. TIPS compliance averaged 91%. This study focused on targeted fall prevention interventions specific to the patient's fall risk, and supports the intervention. The level and quality of this study is VC. All of these studies support individualized or targeted interventions to help reduce patient falls by educating the patient, family and staff on the patient's fall risks.

Theoretical Framework

The middle range theory that was the most effective evidence to implement was Lewin's Change Theory for the project. The theory is known as the Unfreeze, Change, Refreeze, which refers to three stages of change process (Manchester et al., 2014). The unfreeze stage focused on preparing the neuro care unit to accept that change was necessary in reducing falls, which involved breaking down the existing process before building a new way of operating. To help prepare the neuro care unit, the beliefs, values, attitudes, and behaviors that defined it was challenged (Manchester et al., 2014). In identifying the challenges, meetings with unit leadership were conducted to find the root causes of patient falls on the unit.

After the challenges created in the unfreeze process, the change stage was when the neuro care unit resolved its challenges and looked for new ways to reduce falls by using TIPS. In order to accept using TIPS and the contribution to make it successful, the neuro care staff had to understand how it benefited them and the patient population. During this unfreezing stage, TIPS education was provided to staff to implement the change.

When changes took shape and the unit embraced TIPS, the unit was then ready to refreeze. The outward signs of refreeze were a completed TIPS handout in each admission folder, completed bedside TIPS posters, and reduced fall rates. The refreeze stage also helped

the neuro care unit institutionalize the changes, by making sure that the TIPS protocol was used all the time, and that it was incorporated into every shift every day (Manchester et al., 2014).

With reduced falls, the staff on the neuro care unit felt confident and comfortable with the new process of using TIPS. It was monitored through spot audit observation done twice weekly.

Methods

The NCU provides care for an average of 140 adult neuro medical patients per month, which is approximately 450 patients during the implementation period. All admitted and transferred patient to the unit were included in the project with no exclusions. At the time of the project, it was staffed by 24 registered nurses and 14 patient care technicians. The implementation team consisted of three unit champions and one unit manager that helped encourage the staff in using TIPS to reduce falls. TIPS is a three step fall prevention process that includes Universal Fall Precautions that applies to all patients admitted or transferred to the NCU. The 3 steps include:

1. Identifying risk factors by conducting the Johns Hopkins fall risk assessment (JHFRA) with the patient at the bedside.
2. Developing a tailored or personalized plan with a TIPS poster at bedside with the patient by circling the intervention icons to reduce fall risk.
3. Consistently carrying out the plan including use of a walker at all times or getting the patient up with one or two person assistance.

At bedside, the TIPS poster showed icons that communicated alerts that were understood and actionable at reducing falls, (Appendix). It was designed to support nurses in partnering with patients, family members, and other staff members in the three-step fall prevention process. If there were no changes in status to the patient's fall risk, the TIPS poster was updated with

today's date, letting the patient, family, and NCU staff know that TIPS was current. Neuro care patients had a TIPS handout placed in their admission folder and completed at the bedside with the TIPS poster.

The structure measure was the number of staff trained on TIPS. Observational data extraction collected were the number of staff trained on TIPS out of the number of staff caring for patients. This data was collected weekly for the month of September, with duplicate names counted once. This data was reported as a percentage and 100% of NCU staff were trained on TIPS (n=38), (Table 1). Process measures chosen for the intervention was analyzed and graphed in a run chart to identify trends through runs, shifts, and alternating points that suggest cause variation exists, (Table 2 and Table 3). The hospital provided data for falls and falls with injury. The outcome measures chosen for this intervention were falls per 1000 patient days and plotted in a bar chart, (Table 4).

Implementation tactics included: obtaining a local needs assessment, creating a formal implementation blueprint that included with all goals and strategies for TIPS implementation, identifying early adopters, assessing for staff readiness, identifying barriers and facilitators, promoting adaptability, and data sharing with staff.

There were no human subjects or vulnerable populations impacted by this quality improvement project and it met the criteria for non-human subjects determination. NCU staff members who implement the practice changes did so under voluntary conditions. To protect the confidentiality and privacy of individuals, TIPS handouts contained no patient identifiers; and were placed in the patient's admission folder in their private room during the hospital stay. There were no conflicts of interest.

Results

The changes in practice was using the TIPS poster for patient tailored interventions on preventing falls. It was a process change with a TIPS poster filled out and updated by staff using the Johns Hopkins Fall Risk Assessment that the hospital currently uses. The TIPS poster was updated with any new changes in the patient's fall risk, and if no changes, the date was changed daily to reflect the current patient specific interventions on the TIPS poster. This resulted in TIPS poster compliance averaging 90% (Goal 100%) from October 9, 2020 to December 31, 2020. The TIPS project was planned and scheduled to start October 5, 2020 but was not adopted and used until October 9, 2020. While waiting for the hospital's approved supplies to arrive to hang posters in the patient's room, the NCU unit champions and staff were re-educated, coached by the project leader prior to the new start date.

A barrier to the TIPS project was staff placing the TIPS in the patient's admission folder even after the NCU staff were educated and encouraged so the patient would have a copy before discharge. This part of the project was not adopted and resulted in TIPS compliance in the patient's admission folder at 0%. The goal was 100% compliance during October 2020 to December 2020. During huddle, a majority of the staff stated that completing the TIPS handout and folder was difficult because of the additional steps, and the poster was their main priority. Also, staff stated when a patient was discharged, their fall status would change and the TIPS handout in the admission's folder did not reflect the current fall risk. Staff adherence to the TIPS poster significantly reduced falls by 67% during the pre/post-intervention for October to December 2019 and October to December 2020. Falls with injury decreased by 14% pre/post-intervention for October to December 2019 and October to December 2020.

Discussion

The relationship between TIPS compliance and falls was inverse: as TIPS compliance increased, falls and falls with injury decreased. This coincides with the results in the Dykes et al. (2010) study which found adherence to using the TIPS posters was 89%, resulting in a 22% decrease in patient falls. Dykes et al. (2017) found that during the six-month pilot study, results from Brigham and Women's Hospital showed TIPS compliance averaged 82% and falls decreased by 46%; and at Montefiore Medical Center, TIPS compliance averaged 91% which resulted in a 16% decrease in falls.

A limitation during the first week of implementation was the TIPS posters were printed on white paper and hung on the patient's door. This restricted the patient's view of their TIPS poster when the door was closed, which was the norm when the patient was not a high fall risk. Visibility of the sign was also an issue for staff, but for a different reason. While the sign on the door was visible when the door was closed, it was lost due to many other white paper signs also posted on the door. After week one, the TIPS poster was reprinted on bright yellow paper and placed on the adjacent wall in the patient's room for easy viewing by the patient and caregivers in the room. Finally, with suggestions from patients, the TIPS poster was reprinted for the third time on 11" x 17" yellow poster paper, laminated, and hung in the patient's room. The patients were able to see their TIPS poster and any staff member that entered the room could see the patient's TIPS poster. Several days were affected by this adjustment, but ultimately the poster was visible, and the results resembled the literature.

Another limitation was the project process at the host agency, which required the benchmark data start in August, just prior to the intervention. With an issue such as more sporadic falls, it seemed counterintuitive to benchmark one month of data to three months of

intervention, but that was the host agency's process. Unfortunately, the month of August as a benchmark had exactly zero falls. This result was in stark contrast to the data from the fourth quarter in 2019 that averaged 9.78 falls and 0.90 falls with injury, which was used to conceptualize the project originally. Zero falls data was also dissimilar to the data from the seven months in 2020 just prior to the intervention period, which was 14.5 falls. When comparing the pre-intervention falls benchmark of August 2020 to post-intervention falls data from October to December 2020, falls increased. August 2020 had zero falls recorded; therefore, any falls compared to August showed that the TIPS project did not reduce falls, but actually increased them.

However, compared to October 2019 to December 2019, falls and falls with injury reduced during the post-intervention months of October 2020 to December 2020 and averaged 3.22 falls and 0.77 falls with injury. Further examination of the falls rate in the seven months prior to the project implementation revealed the average falls rate of 14.5, which seems to point to August being more of an outlier, than the TIPS being completely ineffective. When looked at in a broader context, the falls rates mirror what was expected with this intervention. It is plausible that more benchmark data and an extended intervention period and the reduction of Covid 19 patients in the unit would have permitted the results to more closely mirror those in the literature.

Conclusion

The usefulness and relevance of TIPS in reducing falls and falls with injury in hospitals have a significant impact and outcome on the patient's care and stay at the hospital. Patient falls at hospitals impact the patient with potential harm and increased hospital stay, and have a financial impact on the hospital and the healthcare economy. TIPS has shown through evidence

to help reduce patient falls when used consistently, resulting in better patient outcomes and quality of healthcare.

The particular strength of the project is that TIPS is tailored towards each patient, and the tool provides education to the patient and family on their fall risk and needs. Measures to assure sustainability of TIPS include continued engagement of managers, leaders, patients, and staff.

TIPS education is also part of new staff orientation and organizational policies.

References

- Ang, E., Mordiffi, S., & Wong, H. (2011). 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* 67(9), 1984–1992. doi: 10.1111/j.1365-2648.2011.05646.
- Dykes, P., Carroll, D., Hurley, A., Lipsitz, S., Benoit, A., Chang, F... Middleton, B. (2010). Fall prevention in acute care hospitals: A randomized trial. *JAMA* 304(17): 1912-1918. doi: 10.1001/jama.2010.1567
- Dykes, P., Duckwork, S., Cunningham, S., Dubois, M., Driscoll, Z., Feliciano, M.,...Scanlan, M. (2017). Pilot testing tall TIPS (Tailoring Interventions for Patient Safety): A patient-centered fall prevention toolkit. *The Joint Commission Journal on Quality and Patient Safety* 43(8), 403-413.
- Florence C., Bergen G., Atherly A., Burns E., Stevens J., & Drake C. (2018). Medical costs of fatal and nonfatal falls in older adults. *Journal of the American Geriatrics Society*, 66(4), 693-698.
- Hee-Yoo, S., Reul-Kim, S., & Soon-Shin, Y., (2015). A prediction model of falls for patients with neurological disorder in acute care hospital. *Journal of the Neurological Sciences*, 356(1-2) 113-117. Retrieved from <https://doi.org/10.1016/j.jns.2015.06.027>
- Homann, B., Plaschg, A., Grundner, M., Haubehofer, A., Griedl, T., Ivanic, G...Homann, CN, (2013). The impact of neurological disorders on the risk for falls in the community dwelling elderly: a case-controlled study. *BMJ*, 3(11), doi: 10.1136/bmjopen-2013-003367.
- Manchester, J., Gray-Miceli, D., Metcalf, J., Paolinid, C., Napiere, A., Coogle, C., & Owens, M.

(2014). Facilitating Lewin's change model with collaborative evaluation in promoting evidence based practices of health professionals. *Evaluation and Program Planning*, 47, 82–90.

O'Neil, C., Krauss, M., Bettale, J., Kessels, A., Costantinou, E., Dunagan, C. & Fraser, V.

(2015). Medications and patient characteristics associated with falling in the hospital. *Journal of Patient Safety*, 10(10), 1-7.

Opsahl, A., Ebright, P., Cangang, M., Lowder, M., Scott, D. & Shaner, T. (2016). Outcomes of adding patient and family engagement education to fall prevention bundled interventions.

Journal of Nursing Quality; 10(10), 1-7.

Titler, M., Conlon, P., Reynolds, M., Ripley, R., Tsodikov, A., Wilson, D., Montie M. (2016).

The effect of a translating research into practice intervention to promote use of evidence-based fall prevention interventions in hospitalized adults: A prospective pre–post implementation study in the U.S, *Applied Nursing Research*, 31, 52-59.

<https://doi.org/10.1016/j.apnr.2015.12.004>

**University of Maryland School of Nursing
Evidence Review Table**

Citation: Dykes, P., Carroll, D., Hurley, A., Lipsitz, S., Benoit, A., Chang, F... Middleton, B. (2010). Fall prevention in acute care hospitals: A randomized trial. <i>JAMA</i> 304(17): 1912-1918. doi: 10.1001/jama.2010.1567. Retrieved from https://jamanetwork.com/journals/jama/fullarticle/186836					Level 2
Purpose/ Hypothesis	Design	Sample	Intervention	Outcomes	Results
“The purpose of this study is to investigate if a fall prevention tool kit (FPTK) within the health information technology (HIT) decreases patient falls in hospitals.”	Cluster Randomized Control Study	Sampling Technique: Cluster Random # Eligible: All patients admitted or transferred to selected units from January 1, 2009, through June 30, 2009, were included in the study. # Accepted: 8 units from 4 hospitals # Control: n=5104 patients # Intervention: n=5160 patients Power analysis: 5100 patients was target sample for control/intervention group (1275 patients in each of the 8 units), estimated to provide 80% power (with $\alpha = .05$) to detect a decrease in the fall rate. Power analysis met, minimizing risk of falls and fall related injury. Group Homogeneity: Intervention and control units – similar race and	Control: Usual care on fall prevention and educational program on fall risk assessment and prevention. Intervention: FPTK integrated into workflow and HIT application. Intervention fidelity: Nurse completed a valid fall risk assessment scale and the FPTK software tailored fall prevention interventions for patients’ specific fall risk needs. FPTK posters, education handouts and plans of care were communicated to patients, family members, and staff members.	Dependent Variable: Patient falls defined as an unplanned fall by patient to the floor during hospital stay. Patient falls with injury defined as trauma/injury from fall. Adherence of FPTK above patient’s bed. Measurement tool (reliability), time, procedure: Primary outcome = patient falls per 1000 patient-days in targeted units during study period; Secondary outcome = patient falls with injury reported at the time of fall in an event reporting system in all units by the patient’s nurse. Validated by hospital quality personnel and unit managers; Completed computerized TIPS poster above patient’s bed done by random	Statistical Procedures(s) and Results: fall rates were significantly higher in control units (4.18 [95% confidence interval {CI}, 3.45-5.06] per 1000 patient-days) than in intervention units (3.15 [95% CI, 2.54-3.90] per 1000 patient-days; P = .04). No significant effect was noted in fall-related injuries; FPTK adherence - printed for 93.2% of patients, with 89% adherence with placing poster above the patient's bed.

		gender; ≥ 65 years mean age = 78.8 (SD, 8.4) years, <65 years mean age = 47.9 (SD, 11.9) years		assessment.	
Citation: Dykes, P., Duckwork, S., Cunningham, S., Dubois, M., Driscoll, Z., Feliciano, M., Ferrazzi, F...Scanlan, M. (2017). Pilot testing fall TIPS (Tailoring Interventions for Patient Safety): A patient-centered fall prevention toolkit. <i>The Joint Commission Journal on Quality and Patient Safety</i> 43 (8) 403-413 doi: https://doi.org/10.1016/j.jcjq.2017.05.002					Level 5
Purpose/ Hypothesis	Design	Sample	Intervention	Outcomes	Results
“The purpose of this study is to prevent falls with the Tailoring Interventions for Patient Safety (TIPS) at Brigham and Women's Hospital (BWH; Boston) and Montefiore Medical Center (MMC; Bronx, New York) and to measure protocol compliance.”	Pilot Study	Sampling Technique: Convenience # Eligible: 8 units at BWH and MMC # Accepted: 7 (94 beds) at BWH and 1 (36 beds) MMC # Control: All patients accepted to the 8 units at BWH and MMC from Jan to Jun 2015. # Intervention: All patients accepted to the 8 units at BWH and MMC from Jan to Jun 2016. Power analysis: Not available Group Homogeneity: Not available	Control: Standard fall risk assessment Intervention: TIPS that includes fall risk assessment. Intervention fidelity: Nurses complete the fall risk assessment online and TIPS draws on the risk assessment data to identify a tailored fall prevention plan for each individual patient's risk profile. A Fall TIPS poster and handout is communicated to patient and care team.	Dependent Variable: Patient falls/injuries, Fall TIPS adherence Measurement tool (reliability), time, procedure: Fall rates per 1000 patient days and fall rate injury per 1000 patient days - Patient fall and patient fall injuries - monthly reports done by hospital quality departments; reports to staff for communication results; TIPS adherence - weekly spot checks on each unit to make sure poster is complete with patient name, correct date, risk factors, and prevention plan.	Statistical Procedures(s) and Results: BWH, Fall TIPS compliance averaged 82%, mean fall rate decreased - 3.28 to 2.80 falls per 1,000 patient-days from January through June 2015 versus 2016, mean fall with injury rate decreased - 1.00 to 0.54 per 1,000 patient-days. MMC, Fall TIPS compliance averaged 91%, mean fall rate slightly increased - 3.04 per 1,000 patient-days for January through June 2015 to 3.10 per 1,000 patient-days for January through June 2016 perhaps because mean fall rate was relatively low at baseline, mean fall with injury rate decreased - 0.47 to 0.31 per 1,000 patient-days.
Citation: Titler, M., Conlon, P., Reynolds, M., Ripley, R., Tsodikov, A., Wilson, D., Montie M. (2016). The effect of a translating					Level

research into practice intervention to promote use of evidence-based fall prevention interventions in hospitalized adults: A prospective pre–post implementation study in the U.S, <i>Applied Nursing Research</i> , 31, 52-59. https://doi.org/10.1016/j.apnr.2015.12.004					4
Purpose/ Hypothesis	Design	Sample	Intervention	Outcomes	Results
“To evaluate the impact of implementing, in 3 U.S. hospitals, evidence-based fall prevention interventions targeted to patient-specific fall risk factors (Targeted Risk Factor Fall Prevention Bundle). Fall rates, fall injury rates, types of fall injuries and adoption of the Targeted Risk Factor Fall Prevention Bundle were compared prior to and following implementation.”	Prospective Pre–Post Implementation Cohort Design	# Eligible: Medical records - patients 21 years of age or older, received care on the study unit > 24 hours during the designated data collection period. # Accepted: 10 records/per unit/month showing 3 months of care pre-implementation and 3 months post-implementation were abstracted; n=390 records # Control: pre-implementation period n=390 records at baseline # Intervention: post-implementation period n=390 records Power analysis: NA Group Homogeneity: Not available	Control: Pre-implementation of targeted risk factor fall prevention bundle Intervention: Targeted Risk Factor Fall Prevention Bundle with evidence-based fall prevention interventions to reduce patient-specific fall risks. Intervention fidelity: The Targeted Risk Factor Fall Prevention Bundle, developed for this study, focused on interventions that reduce or modify patient-specific fall risk factors. Interventions included previous falls, mobility limitations, elimination, medication, mental status, and factors that increase serious injury from falls.	Dependent Variable: fall rates defined as an unplanned descent to the floor; fall injury rates defined as minor, moderate, major, and death as a result of the fall, use of Targeted Risk Factor Fall Prevention Bundle defined as evidence based interventions to reduce fall risks. Measurement tool (reliability), time, procedure: Fall rates - calculated, by the number of inpatient falls multiplied by 1000 and divided by the total number of inpatient days, fall injury calculated by multiplying the number of inpatient falls with injuries by 1000 and dividing by total number of inpatient days.	Statistical Procedures(s) and Results: Fall rates declined from pre- (X = 3.69; SD = 1.43) to post- implementation (X = 2.7; SD = 1.34) (–0.251 on the log scale; SE = 0.15), demonstrated a trend toward significance (p = 0.09) with a 22% decline in fall rates; but did not change for those targeting medications; analysis of medical records data – the use of Targeted Risk Factor Fall Prevention Bundle targeting individual patient fall risk factors resulted in significant improvements (p < 0.001) from pre- to post-implementation indicating that fall prevention interventions were implemented.
Citation: Ang, E., Mordiffi, S., & Wong, H. (2011). Evaluating the use of a targeted multiple intervention strategy in reducing patient falls in an acute care hospital: A randomized controlled trial, <i>Journal of Advanced Nursing</i> 67(9), 1984–1992. doi: 10.1111/j.1365-2648.2011.05646.x					Level 2

Purpose/ Hypothesis	Design	Sample	Intervention	Outcomes	Results
<p>“The aim of this study was to examine the effectiveness of a targeted multiple intervention strategy in reducing the number of falls for patients identified as high-risk for falls.”</p>	<p>Randomized Controlled Trial</p>	<p>Sampling Technique: Random # Eligible: n=6498 # Excluded: n=4676 # Accepted: n=1822 # Control: n=912 participants # Intervention: n=910 participants Power analysis: Total of 900 participants for the control and intervention group to achieve a 95% CI of 1.4–2.8% Group Homogeneity: Unavailable</p>	<p>Control: Usual care of general fall prevention measures including placing the call-bell and bed locker within the patient’s reach, placing the bed rails raised and keeping the bed at the lowest position Intervention: Targeted multiple interventions with usual care Intervention fidelity: Targeted multiple interventions – a 30 minute educational session on targeted multiple interventions, according to the participants’ risk factors; the appropriate interventions were specific to each risk factor of the Hendrich II Falls Risk Mode.</p>	<p>Dependent Variable: Patient falls – not defined Measurement tool (reliability), time, procedure: Fall rates for control and intervention group were reported with 95% CI, calculated using Wilson method and compared using the Chi-square test.</p>	<p>Statistical Procedures(s) and Results: The fall incidence rates were 1.5% (95% CI: 0.9–2.6) in control group and 0.4% (95% CI:0.2–1.1) in the intervention group, respectively. The relative risk estimate of 0.29 (95% CI: 0.1–0.87) favors the intervention group.</p>

**University of Maryland School of Nursing
Synthesis Table**

Level of Evidence	# of Studies	Summary of Findings	Overall Quality
II	2	<p>Dykes et al. (2010) found that a fall prevention toolkit (FPTK) that tailored fall prevention interventions addressing patients’ specific determinants of fall risk decreased falls by 22% over a six month period. Adherence to using TIPS poster at patient bedside for 93.2% of patients was 89%. Falls were measured by patient falls per 1000 patient-days in targeted units during study period. FPTK adherence was measured by random assessment of completed computerized TIPS poster above patient’s bed.</p> <p>Ang et al. (2011) found fall rates decreased from 1.5% control group to 0.4% on intervention group with targeted multiple fall prevention interventions. Falls were calculated with the Wilson method and compared using the Chi square test.</p> <p>Both of these studies focused on targeted fall prevention interventions specific to the patient’s fall risk. Therefore, both studies supports the intervention.</p>	<p style="text-align: center;">B</p> <ul style="list-style-type: none"> • Cluster randomized control design, not blinded • Sufficient sample size with 5100 for control/intervention group • Reasonably consistent results with sufficient numbers • Use of reliable and valid measures with patient falls per 1000 patient-days • Reasonably consistent recommendations <p style="text-align: center;">B</p> <ul style="list-style-type: none"> • Randomized control trial design, not blinded • Sufficient sample size of 900 for control/intervention group • Use of reliable and valid measures with control/intervention group reported with 95% CI, calculated using Wilson method and compared using the Chi-square test.
IV	1	<p>Titler et al. (2016) found fall rates declined from pre- implementation from 3.69 to post- implementation 2.7 with using the Targeted Risk Factor Fall Prevention Bundle. A 22% fall rate decrease. Fall rates were calculated by the number of inpatient falls multiplied by 1000 and divided by the total number of inpatient days, fall injury calculated by multiplying the number of inpatient falls with injuries by 1000 and dividing by total number of inpatient days.</p> <p>This study focused on targeted fall prevention interventions specific to the patient’s fall risk, and supports the intervention.</p>	<p style="text-align: center;">B</p> <ul style="list-style-type: none"> • Cohort study, no randomization • Well-defined design and methods - prospective, pre–post cohort implementation design using a participatory partnership research approach. • Sufficient sample size – 390 records for pre/post implementation • Use of reliable and valid measures - data analyzed using multivariate analysis

Level of Evidence	# of Studies	Summary of Findings	Overall Quality
V	1	<p>Dykes et al. (2017) found that during the six month pilot study, results showed fall rates decreased at BWH from 3.28 to 2.80 and the mean fall with injury rate for these periods decreased from 1.00 to 0.54 per 1,000 patient-days. TIPS compliance with using Fall TIPS averaged 82%. MMC, mean fall rate increased marginally from 3.04 to 3.10 and while the mean fall with injury rate decreased from 0.47 to 0.31 per 1,000 patient-days. It is noted that the increase could be because MMC's mean fall rate was relatively low at baseline. TIPS compliance averaged 91%.</p> <p>This study focused on targeted fall prevention interventions specific to the patient's fall risk, and supports the intervention.</p>	<p style="text-align: center;">C</p> <ul style="list-style-type: none"> • Pilot study, no randomization • Well-defined methods - The Institute for Healthcare Improvement's Framework for Spread is the conceptual model for pilot implementation • Use of reliable and valid measures - fall rates per 1000 patient days; fall rate injury per 1000 patient days. TIPS adherence - weekly spot checks on each unit to make sure poster is complete with patient name, correct date, risk factors, and prevention plan. • Reasonably consistent recommendations

Table 1

Staff Training on TIPS

Training Date	# of Staff Trained	# of Staff Caring for Patients	Weekly Total % of Staff Trained
9/1/2020	8	8	100%
9/8/2020	7	8	88%
9/15/2020	6	8	75%
9/22/2020	10	10	100%
9/29/2020	7	7	100%
	38	Total NCU Staff 38	

Table 2

TIPS Handout in Admission Folders

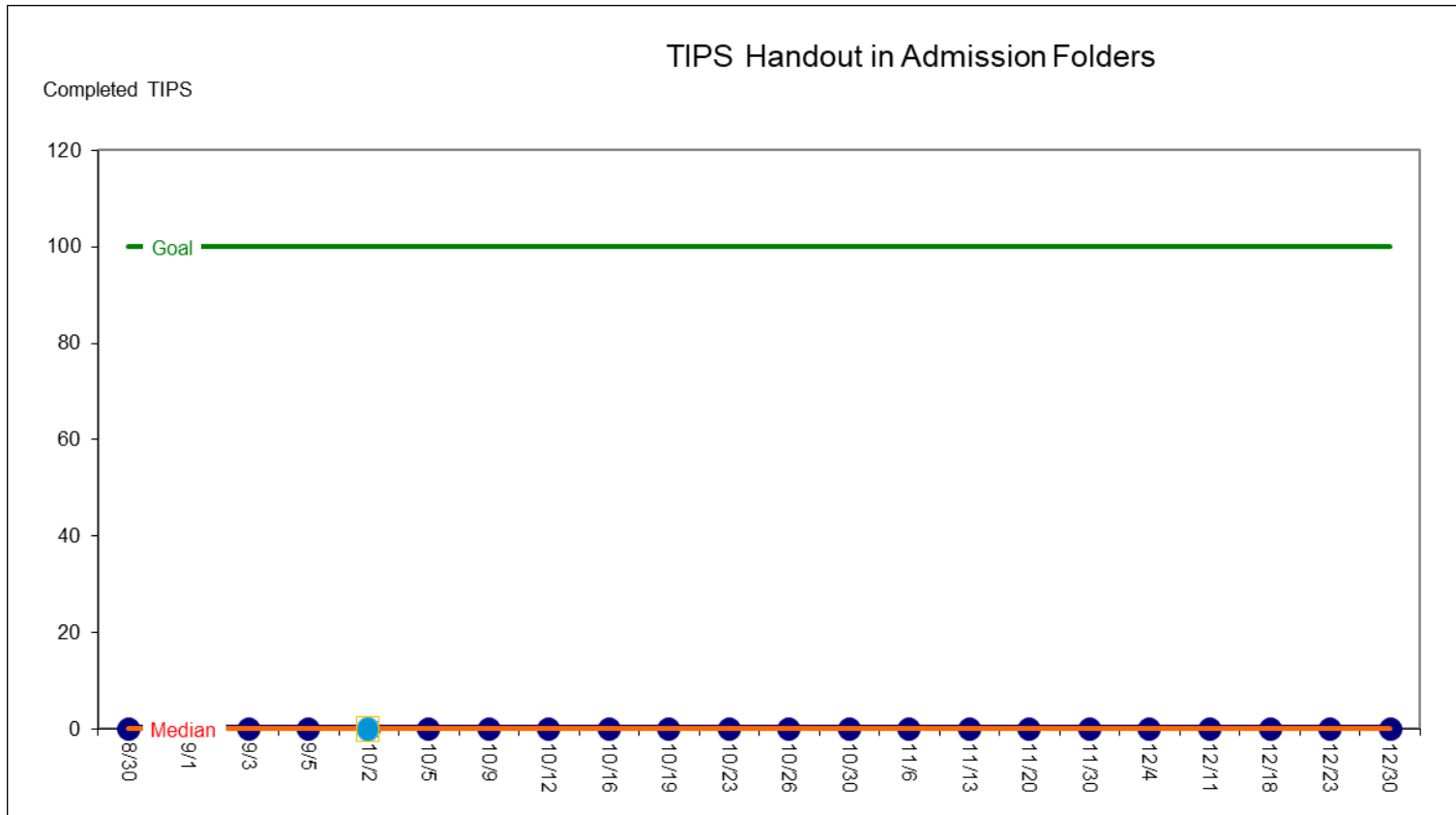


Table 3

TIPS Posters Completion

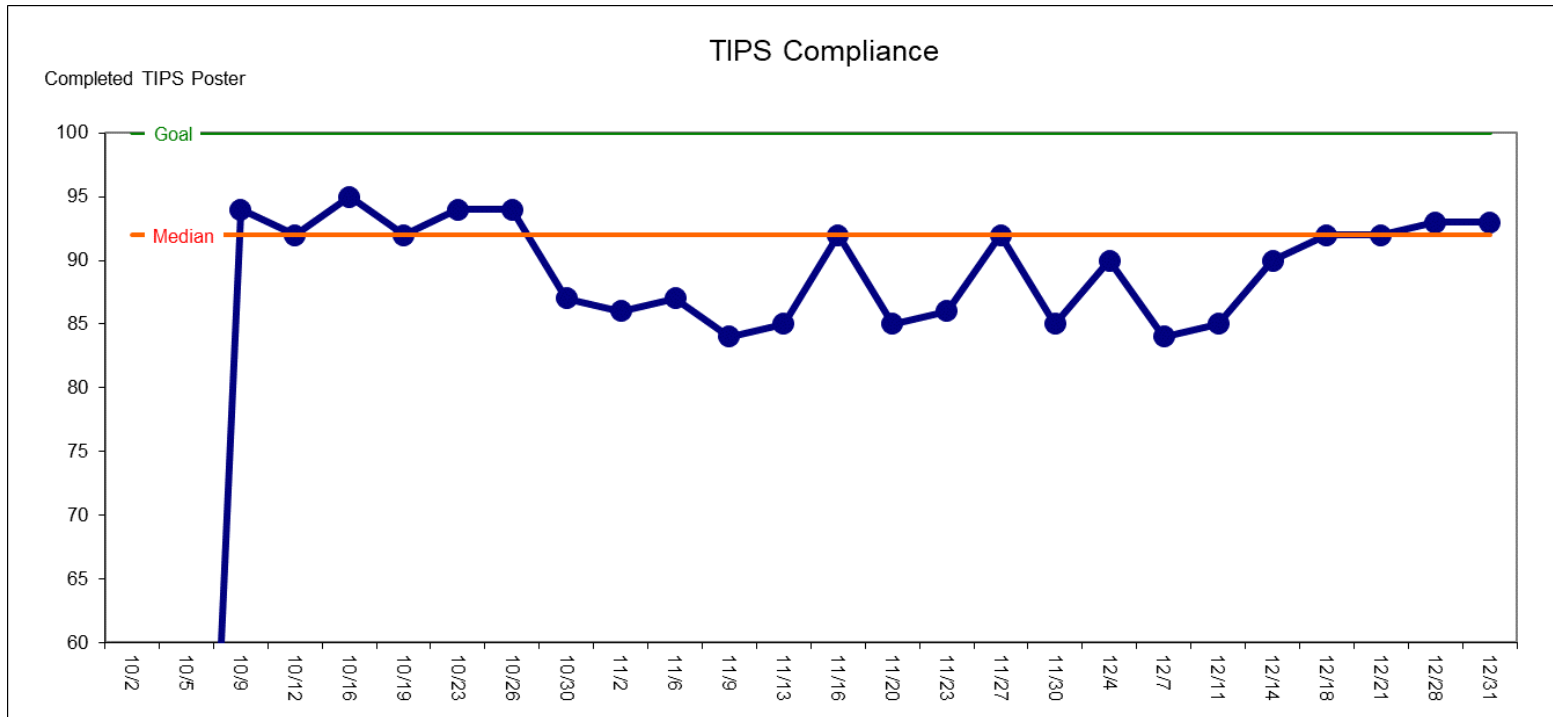
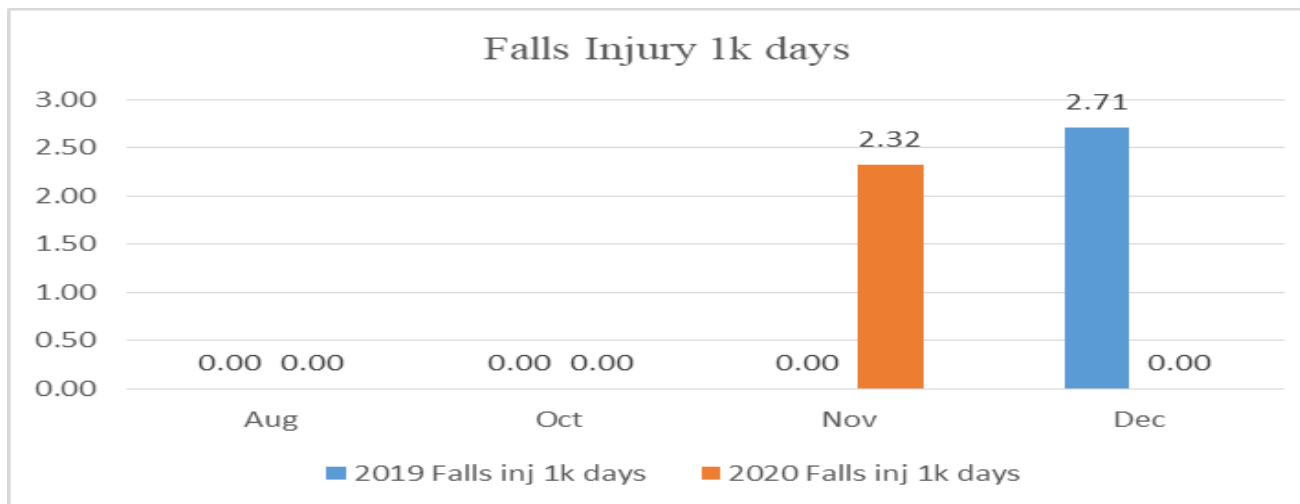
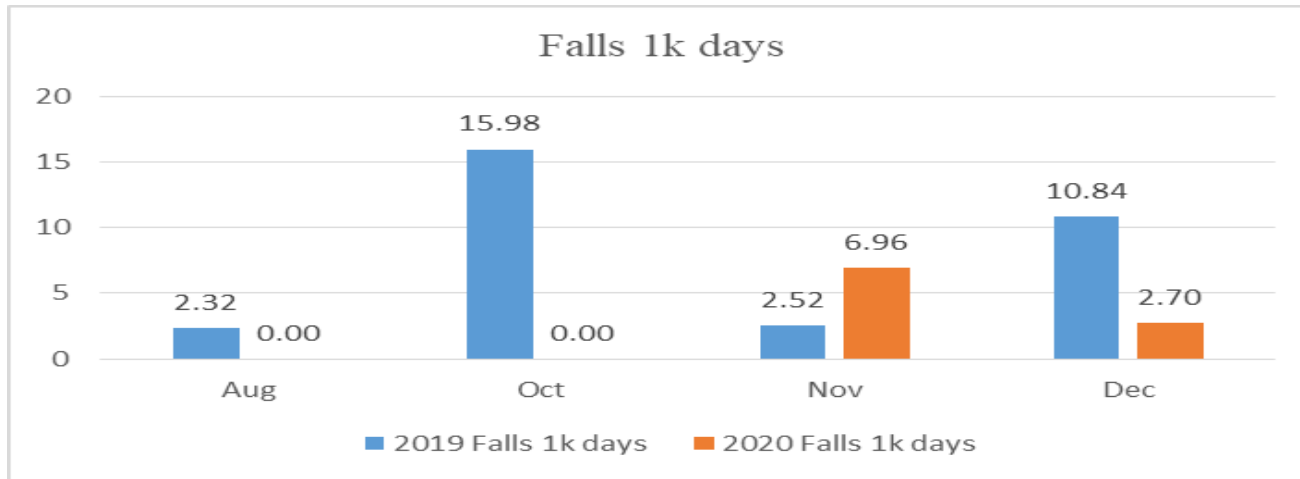


Table 4

Number of Falls and Falls with Injury



Appendix

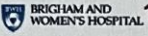
















TIPS with Instructions

Patient-Centered Fall Prevention Toolkit
Paper Fall TIPS Instruction Sheet for Nurses

Overview

Preventing falls is a three step process: 1) identifying risk factors; 2) developing a tailored or personalized plan to decrease risk; and 3) consistently carrying out the plan. The paper Fall TIPS tool is designed to support nurses in partnering with patients and their family members in the 3-step fall prevention process.

How To Use:

 1 Patient Name: _____		1 Date: _____	
2 Fall Risks (Check all that apply)		3 Fall Interventions (Circle selection based on color)	
 History of Falls <input type="checkbox"/>	 4 Medication Side Effects <input type="checkbox"/>	Communicate Recent Falls 	Walking Aids  Crutches  Cane  Walker
 Walking Aid <input type="checkbox"/>	 5 IV and/or Equipment <input type="checkbox"/>	5 IV and/or Equipment Assistance When Walking 	6 Toileting Schedule: Every _____ hours  Bed Pan  Assist to Commode  Assist to Bathroom
 Unsteady Walk <input type="checkbox"/>	May Forget or Choose Not to Call <input type="checkbox"/>	Bed Alarm On 	Assistance Out of Bed  1 person  2 people

1. Write the patient's first name and last updated date. Erase all information when patient is discharged
2. Left column lists all fall risk factors from the Morse Falls Scale (MFS). Go through assessment with the patient and check off any risks that apply to patient. These risk factors should match your MFS documentation completed in the EHR and be updated at all times.
3. Right column lists all evidence-based interventions and matches them by color to the appropriate risks. Selecting the interventions that match the color associated with each risk factor will result in a plan that is most likely to prevent a fall for a patient with that particular risk profile. However, you should also use your clinical judgment to tailor the interventions to your patient. Based on individual patient differences, you may choose more interventions or you may choose not to select a recommended intervention.
4. Corresponding MFS item refers to multiple co-morbidities. Patient with multiple co-morbidities are often on many medications that can increase the risk for falls. Some of these medications may increase the need for frequent toileting.
5. If patient has a heplock and does not have equipment attached, check off the risk factor "IV and/or Equipment" without circling the corresponding intervention "IV Assistance When Walking". As always, use your clinical judgment.
6. Both the "Medication Side Effects" and the "IV and/or Equipment" risk factors have the "Toileting Schedule" as a recommended intervention. Toileting schedule should be ordered for every 1 or 2 hours based on your clinical judgment.

For any questions, please contact _____