

Implementing the Fall TIPS Tool in a Medical-Surgical Unit

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Abstract

Problem: Despite adopting a standard fall prevention program in conjunction with frequent patient rounding, falls consistently remained a patient safety issue in a medical-surgical unit of a non-profit community hospital. In addition, a lack of patient awareness about the fall prevention plan contributed to the fall rate of 2.2 falls per 1,000 bed days in 2020. Furthermore, in July 2021, six unintentional patient falls in this unit scored the highest number of falls in the whole hospital. **Purpose:** This quality improvement project aimed to implement and evaluate the effectiveness of an evidence-based bedside Fall TIPS (Tailoring Interventions for Patient Safety) tool in promoting patient and family engagement in the fall prevention plan to reduce incidents of falls. **Methods:** The QI project involved training nursing staff on the 3-steps fall prevention process, including performing a fall risk assessment, creating a tailored fall prevention plan, and performing the plan consistently. Staff education compliance was confirmed through a sign-off education completion form. The Fall TIPS laminated posters were placed in each patient's room. Nurses' adherence to the Fall TIPS tool was measured weekly over the 15 weeks using validated questions with Yes/No/Not-Applicable responses using a pencil/paper. **Results:** The result indicated that 100% of the unit RN completed the Fall TIPS training. The average Fall TIPS utilization was 63.4%. The average patients and families that verbalized patients' fall risk factors increased to 60.5%, the baseline was 28%, and the average understanding of the fall prevention plan increased to 60.7% from the baseline of 38%. Patients' unintentional falls decreased from 6 in July to 2 in December 2021. **Conclusion:** Nurses increased Fall TIPS adherence increased patient engagement in their fall prevention plan and reduced patients' fall. Additional time will be required to determine whether the practice change and outcomes are sustainable.

Implementation of the Fall TIPS Tool in a Medical-Surgical Unit

Unintentional Patient falls during hospitalization continually concern healthcare institutions globally despite numerous fall prevention strategies in the past several years (Avanecean et al., 2017). In the United States, approximately 700,000 to 1 million hospitalized patients fall each year, and more than one-third of falls result in injury (AHRQ, 2019). Furthermore, death or severe injury resulting from a fall while being cared for in a hospital is considered a never event. As a result, the Centers for Medicare and Medicaid Services (CMMS) do not reimburse the expenses caused by this incident, leading to increased hospital costs (AHRQ, 2019). A medical-surgical unit in an urban non-profit community hospital had a higher fall rate than peer units. The unit stakeholders agreed that the most contributing factors were patients' factors and inconsistency among staff about the patients' fall risk assessment and fall prevention plan. Despite adopting a standard fall prevention program in conjunction with frequent patient rounding, there were six falls in July 2021, which scored the highest in the hospital.

World Health Organization (WHO) emphasizes that fall prevention strategies should be comprehensive and multifaceted. Interventions targeting individual risk factors prove the best way to reduce falls (WHO, 2018). The Joint Commission (TJC) suggests strategies to prevent falls, such as fall risk screening, including patients and families in the patient's individualized plan, effective fall risk communication between staff, one-to-one education, and post-fall management (TJC, 2015). Fall TIPS includes the TJC recommendation of patient risk assessment, a tailored personalized intervention plan, and patient and family involvement in the plan (Avanecean et al., 2017; Dyke et al., 2017). This quality improvement project aimed to implement and evaluate the effectiveness of the Fall TIPS tool with anticipation in promoting

patient and family engagement in the fall prevention plan to reduce incidents of falls in a medical-surgical unit.

Literature Review

The focus of the literature review was to identify evidence of effective fall prevention recommendations among older patients and how to implement the recommendation successfully in an acute care setting. Various studies supported individualized patient-centered interventions and patient and family engagement in fall prevention plans to decrease fall rates. For example, in a cluster-randomized control trial, Hill et al. (2015) found that individualized fall prevention education to patients combined with training and feedback to staff in conjunction with usual care reduces the rates of falls and fall injuries in older adult patients in hospital units ($P=0.003$). In addition, Dykes et al. (2010) initially conducted a randomized control trial engaging patients and families on the patients' fall prevention plan using Fall TIPS software in four acute care hospitals on 10,265 patients. They found that tailoring Fall TIPS software with fall risk factors and combining patient and family education through handouts and bedside posters decreased the falls rate $P=0.02$, CI 95%. In addition, the Fall TIPS was particularly influential on patients aged 65years or older ($P=0.003$). Christiansen et al. (2020) conducted a multisite study to examine the impact of Fall TIPS program on patients' knowledge, skill, confidence in managing their fall prevention. The researchers concluded that patients with access to the Fall TIPS program are more engaged in their fall prevention plan. Furthermore, the researchers recommended that the care team members should engage patients in their fall prevention plan to increase their understanding, ability, and self-reliance.

Moreover, Duckworth et al. (2019) and Katsulis et al. (2016) studied the useability of the Fall TIPS tool modalities such as laminated Fall TIPS posters, electronic Fall TIPS posters, and

bedside monitor displays. Duchworth et al. (2019) found that all three modalities effectively helped patients' engagement in the fall prevention process, reaching more than 80% clinically significant adherence. In addition, Katsulis et al. (2016) reported that the staff satisfaction score was significantly high ($P < 0.001$) on the paper version of Fall TIPS on the fall prevention process. Next, in a mixed-method study, Ayton et al. (2017) surveyed and interviewed 96 nurses and 24 management personnel in six hospitals. The researchers highlighted barriers to implementing fall prevention programs as complex patients, staff belief that falls are inevitable, ward layout, lack of resources, and ownership. However, strategies like the use of fall data, supportive leadership, training, education, audits, reminders, and feedback helped implement the fall prevention program successfully (Ayton et al., 2017).

The overall theme among the articles is that Patient falls are a critical patient safety issue in hospitals. The most common contributing factors to patient falls are inadequate assessment, communication failure, and insufficient staff orientation (Ayton et al., 2017; Duckworth et al., 2019; Dykes et al., 2010; Hill et al., 2015; Katsulis et al., 2016). Fall Prevention Toolkit (FPTK), also known as Fall TIPS tool, addresses solutions to these contributing factors. It has proven effective in many hospitals, whether they utilize the tool through advanced electronic technology systems or only through paper-based laminated versions (Christiansen et al., 2020; Duckworth et al., 2019; Dykes et al., 2010). While implementing the fall prevention program, barriers such as complex patient's conditions, lack of resources, or staff resistance may arise. However, supportive leadership, staff education, individualized patient education, audits, reminders, and feedback are keys to a successful fall prevention program (Ayton et al., 2017; Hill et al., 2015). The articles have some strengths and limitations. The strengths are that researchers published most of the studies within five years. All studies address the same issue of falls on hospitalized

patients. In addition, all articles focus on multifaceted planned approach solutions such as increasing patients' fall assessment, improving communication, and including patients and families in their fall prevention plan of care. The finding across the studies is consistent. The quality of evidence is Good (B). Considering limitations, although the level of evidence is II and quality is B, the timeframe of Dyke et al.'s (2010) article is before than ten years.

Theoretical Framework

Pender's health promotion model was used to guide this practice change (Figure1) because this model encourages a health-promoting behavior change that improves health, enhances functional ability, and improves the quality of life. The model focuses on three areas: individual characteristics and experiences, behavior-specific cognitions and affect, and behavioral outcomes (Pender, n.d.). The central concepts in Pender's health-promoting model include the person, their environment, health, illness, and nursing (Pender, n.d.). Adult patients and families relate to the concept of person; the hospital inpatient unit connects to the environment. Patients' falls relate to illnesses, and nursing relates to educating patients and families about fall risk factors and individualized-tailored prevention plans. When a nurse educates patients and their families about patients' fall risk factors and develops tailored fall prevention strategies, patients and families are more likely to understand the fall risk and follow prevention strategies that decrease patient falls and fall-related injuries. While implementing the Fall TIPS tool, nurses assess patients' fall risk with the patient in the room using a proper fall assessment tool. Nurses then develop a tailored prevention plan based on the identified risk factors. In each shift, nurses consistently educate and remind the patient and family how to execute the plan consistently; as a result, patients and families understand the risk factors, fall prevention strategies, and follow the procedure to prevent falls and fall-related injuries.

The conceptual framework by Helfrich et al. (2007), as presented in Figure 2, fits together all the major systems that need to come together for a successful implementation. The implementation climate of the medical-surgical unit is favorable for the adoption of the Fall TIPS toolkit. The mission of this organization is to provide innovative, high-quality, and safe health care. The hospital management supported the improvement of patient safety at the unit level. Unit staff had adopted standard fall prevention strategies and frequently rounding. However, the unit fall rate increased, leaving the patients and families out of the plan. At this time, a quality improvement project that included patient and family engagement in the program was an excellent innovation-values fit. This organization's financial resources were limited; however, the overall cost of this project was feasible to print laminated 34 bedside posters and buy some erasable markers to write on the poster. Several nurses in this unit volunteered to support the project as unit champions. It enhanced the adoption and support of the project.

Methods

This quality improvement project occurred on a 34-bed medical-surgical unit in an urban non-profit community hospital. Approximately 60 Registered Nurses were available on the team. On average, the weekly number of patients with the age range adult to older adults who were admitted and transferred onto the unit was 70. Therefore, an estimated 1050 patients were expected to receive the intervention during the implementation period. Every patient transferred or admitted to the unit received the intervention. The additional time provided for those patients and their families who were the most vulnerable, including non-English speaking, older adults with sensory deficits, receiving artificial tubes, multiple intravenous lines, and parenteral nutrition.

During the pre-implementation, training on the fall TIPS protocol occurred, including a PowerPoint presentation, trifold posters, handouts on the three-step fall prevention process, and a one-to-one case study review. After the training, laminated Fall TIPS bedside posters sized 11 X 7 inches were placed on the wall (Appendix A). In the beginning six weeks of the project implementation, nurses assessed a fall risk using a hospital-provided Morse fall risk assessment tool. However, the hospital changed the electronic health record system to EPIC; nurses used the new Hester Davis Scale (HDS) to assess patients' fall risk. Nurses did the fall risk assessment and identified fall risk factors with the patients in their room, initially when patients got admission to the unit. Together they developed the personalized plan by tailoring the color-coded risk factors and circling the intervention icons on the Fall TIPS poster. Nurses updated the poster with patients and families on each shift and when their condition changed; patients carried out the planned intervention as required.

Structure, process, and outcome data were evaluated using run charts. The structure measure of the unit staff education was completed after educating 100% of the unit staff by September 22 (Figure 3). Anonymous pre and posttest were conducted to check the knowledge (Appendix B). Staff signage sheets were used to track the completion of the education. The process measures included whether the Fall TIPS posters were updated, patients verbalized their fall risk factors, and tailored individualized fall prevention plans (Figures 4, 5, & 6). Weekly audits were performed in the patients' room using validated questions with Yes/No/Na responses (Appendix C). Peer-to-peer feedback was provided for the No response. Next, the outcome fall rate was measured on the incident of unintentional falls in the unit as provided by the hospital fall monthly record (Figure 7). Implementation strategies and tactics utilized for the measures included education, reinforcement, reminders, incentives, audits, and feedback. Small mock

simulations were performed using case studies during the training. Staff received doughnuts, coffee, candy, fruit bars, and snacks frequently to increase motivation. The project leader and charge nurses discussed barriers and facilitators in the morning and evening huddles. Biweekly meetings were conducted with change champions. Audits results and staff reminders were placed in the visible areas, including the staff lounge and conference room. Progress shared with Clinical Site Representative (CSR) and unit director and got input from them.

Results

While interpreting the overall data, the structure measure of the staff education was achieved on September 22 when the 100% of the unit staff completed education on the three-step fall prevention process. On the process measures, the overall Fall TIPS utilization was 63.4% through the weekly audits, on the goal of 100%. The run chart analysis showed that there was no outlier data point. After week eight, there was a consistent 6-point upward data trend; the number of runs was consistent with random variation. However, there was a negative spike in the data on week six because staff needed time to adjust to a new complex EPIC EHR system and the new HDS fall assessment tool. After the frequent education and reinforcement, the data trend slowly picked up. Next, the result showed that the average patient and patient designee who could verbalize the patient's fall risk factors was 60.5%, prior to intervention was 28.1%. In addition, the average score of patients who were able to verbalize their tailored fall prevention plan increased from a baseline of 38% to 60.7% (Figures 8 & 9). Finally, the outcome data showed decreased patient falls at the end of the implementation period compared to the last six months of the unit's monthly fall record. The unit had six unintentional patient falls in July and three in August. In the first months of implementation, the number of falls decreased to one. However, the number increased to four in the second month and decreased to two in December (Figure 7).

Some barriers encountered during the project were time constraints, increased float staff use, not including clinicians and patient care technicians in the project, and the unit's multiple priorities. First, the total study period was only 15 weeks; the baseline data was collected on September 7 and continued to mid-December. Next, due to the COVID-19 pandemic, there was increased use of agency-hired or float staff. Although those staff got an education about the three-step fall prevention process, not all staff seemed fully adhere to completing the bedside Fall TIPS. Furthermore, clinicians and patient care technicians who are also considered a part of the patient care team were not in the project. Finally, the unit had multiple competing priorities during the implementation period, such as decreasing the fall rate, implementing a new EHR, and increasing patient satisfaction scores on medication education. These multiple priorities also limited the nurses from entirely focusing only on fall prevention interventions.

Discussion

The fall prevention project was started because of increased patient falls in the unit compared to the peer units. The Medical-Surgical unit leadership had already tried several methods to prevent patient falls, including standard fall prevention and frequent rounding. So, the fall TIPS tool aimed to avoid or decrease patients' falls by increasing their engagement in identifying the fall risk and participating in the fall prevention plan while communicating the plan across care team members. The project's key findings were that the bedside fall TIPS poster helped patients, families, and care teams understand the patients' fall risk factors and individualized fall interventions. In addition, the fall TIPS adherence by nurses increased patient engagement, which helped lower the fall rate. These findings were consistent with studies by Dykes et al. (2010) and Dyke et al. (2017), who implemented the fall TIPS toolkit and had increased patient engagement and decreased patient fall rate compared to pre-implementation.

Dyke et al. (2017) emphasized that staff adherence to the Fall TIPS tool is crucial to reducing the fall rate successfully, which could achieve only 63.4% during the implementation period. In addition, during the new EHR implementation, staff adherence decreased to 36%; it could have affected the patients' engagement rate and caused four falls in October.

Some strategies included maximizing the staff's adherence rate on the fall TIPS completion. In the beginning, both the Morse fall assessment scale and Hester Davis fall assessment scale were included in the staff education to facilitate the smooth transition of the patient fall assessment in the sixth week of implementation. In addition, awareness of the project, continuous education, one-to-one reinforcement, leadership engagement, and updating the results and goal on the bulletin board and each shift huddles were done continuously. Initially, every staff in the unit got treats with candies, cookies, fruit snacks, or doughnuts. The staff members who showed adherence got recognition during shift huddles; they got treats with snacks. In addition, the new float nurses got one-to-one education and fall TIPS hand-outs for reference. The results implied that the strategies and tactics used positively impacted the staff adherence to the bedside poster, which led to increased patient understanding of the fall risk and fall prevention plan.

Conclusion

Decreasing patient falls can decrease hospital costs, increase financial reimbursement, and improve patient care and satisfaction. Using a patient-centered approach to reducing patient falls is promising. The bedside Fall TIPS poster facilitated a visual reminder to patients, families, and staff of the Medical-Surgical unit about the patients' fall risk factors and personalized fall prevention plan. The fall TIPS poster completion by staff and engagement of the patients and their families in the fall prevention plan seemed to positively impact the number of patients falls

towards the end of project implementation. However, there is still much room for improvement in staff adherence to the Fall TIPS tool completion. So, the unit leadership and staff must continue to improve the Fall TIPS adherence and utilize the poster as a communication tool to prevent patient falls.

Some limitations of this project could be improved for future QI projects, such as including nursing assistants, physical therapists, and physicians as part of the Fall TIPS project. In addition, the generalizability of the result is limited due to a single small medical-surgical patient unit and implementation with no comparison to other units. Sustainability was addressed with leadership support, continuous audits, peer feedback, education reinforcement to staff, including float nurses, new staff orientation, and consistent utilization of the Fall TIPS. Additional time will be needed to determine whether the practice changes and outcomes are sustainable.

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Table 1
Evidence Review table

Ayton, D. R., Barker, A. L., Morello, R. T., Brand, C. A., Talevski, J., Landgren, F. S., Melhem, M. M., Bian, E., Brauer, S. G., Hill, K. D., Livingston, P. M., & Botti, M. (2017). Barriers and enablers to the implementation of the 6-PACK falls prevention program: A pre-implementation study in hospitals participating in a cluster randomized controlled trial. PLoS ONE, 12(2), 1–13. DOI: 10.1371/journal.pone.0171932					Level V
Purpose/ Hypothesis	Design	Sample	Intervention	Outcomes	Results
"This study aimed to identify perceived barriers and enablers of the implementation of the 6-PACK fall prevention program to inform the implementation in a randomized control trial" (Ayton et al., 2017)	Multi-center mixed methods study Survey and interview	<p>Sampling Technique: Convenience sample from 6 hospitals</p> <p>Three-year research plan</p> <p>Focus group n=96 nurses working on 16 medical and eight surgical wards</p> <p>24 interviews</p> <p>24 key informants including senior nurse unit managers, senior physicians, Directors of Nursing, and senior personnel involved in quality, safety, and risk management</p> <p>Power analysis: NO</p> <p>Group Homogeneity: No</p>	<p>Intervention fidelity (described the protocol): Questions reflected the COM-B framework that includes three behaviors change construct of capability, opportunity, and motivation</p> <p>42 items of the survey were developed to assess belief about falls, current practice, 6-PACK components (falls alert sign above patients' bed, toilet regime, bathroom supervision, walking aid within reach, low bed, bed/chair alarm), best practice guideline, and recommendation</p> <p>Nurses were invited to complete the survey questionnaire using a five-point Likert scale ranging from strongly</p>	<p>Dependent variable: Participants' response to barriers and enablers of fall prevention</p> <p>Measure: Responses were measured on the COM-B model of capabilities, opportunities, and motivation</p> <p>A 5-point Likert scale was used.</p> <p>Descriptive statistics were calculated for survey responses using Stata MP v 13 statistical software.</p> <p>Quantitative and qualitative data were analyzed with the process of triangulation.</p>	<p>Survey response rate 60% (420/702)</p> <p>Capabilities: 46% of nurses believe that falls are inevitable compared to 23% undecided</p> <p>Only 32% of nurses felt that they got useful training on fall prevention from leaders</p> <p>Opportunity: 75% of nurses agreed that the use of data on fall incidence help to practice change</p> <p>35% of nurses were natural, and 42% agreed that there was leadership support on fall prevention</p> <p>Motivation: 80% of nurses believed that</p>

			<p>disagree to agree strongly.</p> <p>24 interviews were conducted with senior staff to find out hospital practices, policies, and organizational context influencing fall prevention interventions</p> <p>Focus group and interview data were analyzed thematically, and survey data descriptively</p>		<p>they were responsible for fall prevention</p> <p>Conclusion: The researchers concluded that regular face to face education and training for nurses; provision of equipment; audit, reminders, and feedback; leadership and champions; and the provision of falls data are keys to successful fall prevention</p>
Christiansen, T. L., Lipsitz, S., Scanlan, M., Yu, S. P., Lindros, M. E., Leung, W. Y., Adelman, J., Bates, D. W., & Dykes, P. C. (2020). Patient activation related to fall prevention: A multisite study. <i>The Joint Commission Journal on Quality and Patient Safety</i> , 129-135. https://doi.org/10.1016/j.jcjq.2019.11.010					Level IV
Purpose/ Hypothesis	Design	Sample	Intervention	Outcomes	Results
"To examine the impact of the Fall TIPS program on patient activation related to fall prevention (Christiansen et al., 2020)."	Pre and posttest study design in a multi-site study	<p>Sampling Technique: Convenient sample from one of the medical units Brigham and Women's Hospital (BWH), one medical unit at Montefiore Medical Center (MMC), and one medical unit at New York-Presbyterian/Columbia University Medical Center (NYP).</p> <p>Eligibility:</p>	<p>The pre and posttest survey focused explicitly on the three-step fall prevention process and the patients understanding of their individualized fall prevention plan.</p> <p>Control: Pretest survey was done using the Patient Activation Measure (PAM-13)</p> <p>Intervention: Posttest survey was done using</p>	<p>Dependent variable: Primary outcome is the level of patient engagement in the study.</p> <p>Measure: Patient engagement was measured in 1-4 different levels in which level 1 indicates the lowest level of engagement to level 4 represents the highest level.</p> <p>Survey responses were converted to</p>	<p>The Cronbach alpha of PAM-13 scale was reliable at Pre: a=0.870 Post: a= 0.870</p> <p>The PAM score showed increased patient engagement score after the Fall TIPS intervention 80.88 (SD +/- 17.48)</p> <p>P<0.0001 compared to a preintervention score</p>

		<p>Patients => 18yrs who were admitted to the hospital >24 hours</p> <p>Inclusion criteria: Patients who are physically and mentally able to participate; alert and oriented, English speaking</p> <p>Exclusion criteria: Patients who are physically and mentally incapable of participating due to severity of disease</p> <p>Total Enrolled: Beginning: n=350 Final sample: n=343</p> <p>Intervention sample: n=185</p> <p>Control Group: n=158</p> <p>Group Homogeneity: In the pre and posttest group, patients' age, gender, and length of stay were similar.</p> <p>Education level was higher among the patients at BWH.</p> <p>There was also a significant difference in the racial or ethnic</p>	<p>the patient activation measure (PAM-13)</p> <p>Independent Variable & Intervention fidelity: The short form of the PAM-13 survey was used to compare patient engagement in fall prevention measures before and after implementation of the Fall TIPS program.</p> <p>The tool has been tested for reliability and validity in use.</p> <p>Cronbach's alpha was used to test the reliability of the scale items.</p> <p>The PAM-13 uses a 4-point Likert scale to rate items from 1=strongly disagree to 4=strongly agree.</p>	<p>engagement scores from 1-100 using the Insignia Health's scoring algorithm.</p> <p>T-test was done to compare patient activation in the preintervention and postintervention groups.</p>	<p>Patient engagement improved at three sites BWH (P<0.001) NYP (P<0.037) MMC (P<0.001)</p>
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		<p>characteristics of patients at MMC.</p> <p>There was no significant difference when pre and posttest groups were compared based on education level and ethnicity.</p>			
<p>Duckworth, M., Adelman, J., Belategui, K., Feliciano, Z., Jackson, E., Khasnabish, S., Lehman, I.-F. S., Lindros, M. E., Mortimer, H., Ryan, K., Scanlan, M., Spivack, L. B., Yu, S. P., Bates, D. W., & Dykes, P. C. (2019) Assessing the effectiveness of engaging patients and their families in the three-step fall prevention process across modalities of an evidence-based fall prevention toolkit: An implementation science study. <i>Journal of Medical Internet Research</i>, 21(1), 1-11. https://doi.org/10.2196/10008</p>					<p>Level IV</p>
Purpose/ Hypothesis	Design	Sample	Intervention	Outcomes	Results
<p>"The study aims to examine if the Fall TIPS modality impacts patient engagement in the 3-step fall prevention process and thus Fall TIPS efficacy" (Duckworth et al., 2019)</p>	<p>Qualitative study A case-control study</p>	<p>Sampling Technique: A quota sample of 5,697 subjects was taken from Brigham and Women's Hospital, Montefiore Medical Center, and New York-Presbyterian Hospital to ensure that all three Fall TIPS modalities were represented in the sample.</p> <p>Modality 1: Electronic fall TIPS Toolkit: n=3 units</p> <p>Modality 2: laminated Fall TIPS Toolkit: n=5</p> <p>Modality 3: Electronic bedside display: n=5units</p>	<p>-In all three sites, nurses completed the assessment and documented in the EHR.</p> <p>-Three Fall TIPS modalities, the laminated Fall TIPS poster, electronic Fall TIPS poster, and patient safety display on bedside monitor were used to communicate patients' fall risk factors and tailored fall prevention plan</p> <p>-Random audits were conducted with the question of whether the patient/ family member know their fall prevention plan</p> <p>-Further audits were conducted to measure</p>	<p>Dependent variable: The dependent variable was the usefulness of the Fall TIPS modality</p> <p>The secondary aim of the study was to determine staff adherence to the Fall TIPS protocol and if there was any difference in adherence among three modalities</p> <p>Measure: The dependent variable was measured by the percentage of patients and families who reported knowing the Patient's fall risk factors and specific personalized intervention and the</p>	<p>All units, regardless of the modality and site, reached a clinically significant rate (>80%) of patient engagement and adherence with the protocol to reduce fall and injury rates.</p> <p>-The authors concluded that each Fall TIPS modality effectively helps patient engagement in the 3-steps fall prevention process of conducting fall risk assessments, developing a tailored fall prevention plan, and consistently implementing the plan</p>

		<p># Eligibility:</p> <p>Only medical/surgical and neurology units were selected for homogeneity in patient characteristics.</p> <p>Inclusion criteria: - English or Spanish speaking and age >17 years, either alert and oriented or have family present and involved in the care -Length of hospital stay >24 hours.</p>	<p>adherence, presence of the Fall TIPS poster at the bedside. -Weekly data were collected in three months from 6 neurology and 7 medical/surgical units of 3 different hospitals.</p> <p>Intervention fidelity: - Fall prevention nurse champions were randomly selected for the audit at random days and times.</p>	<p>presence of the Fall TIPS poster at the bedside. (% of yes: understand fall prevention plan % of yes: adherence to protocol)</p>	
<p>Dykes, P. C., Carroll, D. L., Hurley, A., Lipsitz, S., Benoit, A., Chang, F., Meltzer, S., Tsurikova, R., Zuyov, L., & Middleton, B. (2010). Fall prevention in acute care hospitals; a randomized trial. <i>JAMA: Journal of the American Medical Association</i>, 304(17), 1912-1918. DOI: 10.1001/jama.2010.1567</p>					<p>Level II</p>
Purpose/ Hypothesis	Design	Sample	Intervention	Outcomes	Results
<p>"To investigate whether a fall prevention tool kit (FPTK) using health information technology (HIT) decrease patient falls in hospitals." (Dykes et al., 2010).</p>	<p>Stratified cluster randomized study</p>	<p>Sampling Technique: Stratified random sampling from 4 urban hospitals in the Partners HealthCare System in the Boston and Massachusetts area. Total number of patient n=10,264</p> <p># Eligible: 16 Medical units were assessed for eligibility. Units were eligible if their fall rate exceeded the mean of the hospital, and they were not involved in</p>	<p>Researchers completed the three phases of preliminary work before this study. Phase four: The intervention took six months</p> <p>FPTK software was developed. Based on the Morse Falls Scale (MFS) assessment completed by nurses, the FPTK software tailored fall prevention intervention to address patients' specific fall</p>	<p>Dependent variable: Primary outcome: Patient falls per 1000 patient-days Secondary outcome: Fall-related injuries</p> <p>MEASURE: Patient falls and fall-related injuries measured through the fall report routinely recorded in an event reporting system by the clinician caring for the patients at the time of fall. Unit managers and hospital</p>	<p>Statistical Procedures(s) and Results: Patients' characteristics across treatment groups were calculated using proportion, means with standard deviations, and medians with interquartile ranges.</p> <p>Covariate balance was checked using a stratified Wilcoxon test for continuous confounders and fixed-effects multinomial</p>

		<p>other performance improvement efforts specific to fall prevention</p> <p>-All patients admitted or transferred to selected units from January 1, 2009 through June 30, 2009 made eligible</p> <p># Accepted: 8 medical units; 2 from each hospital.</p> <p># Control: 4 units (1 in each hospital) randomized to usual care. A total number of patients: n=5104</p> <p># Intervention: 4 units (1unit in each hospital) randomized to FPTK. Total number of participating patients n= 5160</p> <p>Power Analysis: The target sample of 5100 patients in each group (1275 patients in each of the 8 units), estimated to provide 80% power($\alpha=.05$) to detect changes in fall rate</p>	<p>risk causes. The FPTK produced bed posters, patient education handouts, and plans of care.</p> <p>Control group: Nurses on the control units received education about providing usual care such as complete fall assessment using MFS, place high-risk fall sign above the bed for patient scoring >45 on MFS, educate patient and family providing booklet/ handouts, and documented plan manually in paper or electronic record.</p> <p>Intervention group: Nurses on the intervention units completed MFS using FPTK that automatically tailored the bed poster. The bed poster was printed and placed above the bed. Those units also educated patients/family members using the automatically tailored handout</p>	<p>quality personnel validated fall incidence.</p>	<p>logistic regression for categorical confounders.</p> <p>Statistical analysis was performed with the use of SAS software, version 9.2.</p> <p>The number of patients falls rates in control units (N=87) is significantly higher than the intervention units (n=67). CI 95%, P=.02.</p> <p>The study concluded that the FPTK was effective with patients age >64 years CI95%, P=.003</p> <p>Conclusion: The use of a fall prevention tool kit in hospital units compared with usual care significantly reduced the falls rate</p>
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		Group Homogeneity: Data on unit census, length of stay (LOS), and fall rates were assessed at four hospitals. Medical units in which fall rate exceeded the mean of the hospital were compared for homogeneity. Those units were matched based on data homogeneity.	Intervention fidelity (describe the protocol):		
Dykes, P. C., Duckworth, M., Cunningham, S., Dubois, S., Driscoll, M., Feliciano, Z., Ferrazzi, M., Fevrin, F. E., Lyons, S., Lindros, M. E., Monahan, A., Paley, M. M., Jean-Pierre, S., & 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. https://www.falltips.org/wp-content/uploads/2018/08/Pilot-Testing-Fall-TIPS-Joint-Commission-2017.pdf					Level V
Purpose/ Hypothesis	Design	Sample	Intervention	Outcomes	Results
"In this article, we describe the process that our team used for pilot testing and for then promoting adoption and spread of Fall TIPS" (Dykes et al., 2017)	Pilot Study	Sampling Technique: Convenience sampling # Eligible: From January through June 16, the paper Fall TIPS tool was pilot tested at two acute care hospitals. Brigham & Women's Hospital (BWH): 2 Oncology units, 3 Neurology units, and 2 Medical units Montefiore Medical Center (MMC): 1 Medical unit	Control: no Intervention: The Institute for Healthcare Improvement's (IHI) framework for Spread (FFS) was used to spread adoption of paper Fall TIPS Toolkit Unit-based leadership and practice councils, members, and unit champions were identified to discuss current fall prevention strategies using the Fall TIPS approach.	Dependent variable: Patients' perception on their understanding of their personal fall risk and their fall prevention plan. Protocol adherence Number of falls and falls with injury Measure: A 5-point Likert scale was used for Patient's perception of their fall risk and prevention plan	Patient Surveys: Patients' understanding of their personal fall risk and individual fall prevention plan improved after the Fall TIPS toolkit implementation Perceived ability of patients to identify fall risk: BWH :(P=0.031) MMC: (P=0.023) Patient knowledge of fall prevention plan BWH: (P=0.264)

		<p>Total patients answered on preintervention survey= 63 Post intervention survey= 63</p> <p>Power analysis: NO</p>	<p>Champions were trained as "super users."</p> <p>All staff on participating units were trained on patient engagement in the three-step fall prevention process, conducting a Morse Fall Scale, and interactive case studies.</p> <p>Prior to go live using five-point Likert scale, patients were surveyed regarding their knowledge of their personal fall risk and their fall prevention plan.</p> <p>On the go-live day, Fall TIPS were hung at the bedside; continuous training was offered for nurses and nursing assistants.</p> <p>Intervention fidelity: Protocol for monitoring adherence, patient fall, and fall-related injury rates were measured weekly via spot checks on each unit.</p> <p>Patients' fall and fall with injury rates were secured through the</p>	<p>Mann-Whitney U test was used to compare patients' survey results pre and post-implementation of Fall TIPS.</p> <p>Protocol Adherence: weekly spot checks were done whether the Fall TIPS posters were completed at the bedside. The rate of adherence was expressed as a percentage from 0-100%.</p>	<p>MMC: (P=0.001)</p> <p>Protocol adherence: MMC=90.5% BWH=82%</p> <p>Fall rates and falls with injury:</p> <p>At MMC: fall rate increased from 3.04 to 3.10 per 1000 patient days</p> <p>Falls with injury decreased from 0.47 to 0.31 per 1000 patient days.</p> <p>At BWH: The fall rate decreased from 3.28 to 2.80 per 1000 patient days.</p> <p>Falls with injury decreased from 1.0 to 0.54 per 1000 patient days.</p>
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			hospital quality department		
Hill, A. M., McPhail, S. M., Waldron, N., Etherton-Beer, C., Ingram, K., Flicker, L., Bulsara, M., & Haines, T. P. (2015). Fall rates in hospital rehabilitation units after individualized patient and staff education programs: a pragmatic, stepped-wedge, cluster-randomized controlled trial. <i>Lancet</i> (London, England), 385(9987), 2592–2599. https://doi.org/10.1016/S0140-6736(14)61945-0					Level II
Purpose/ Hypothesis	Design	Sample	Intervention	Outcomes	Results
"To examine the effectiveness of individualized falls-prevention education for patients." (Hill et al., 2015)	Cluster-randomized control trial	<p>Sampling Technique: Random sampling from eight rehabilitation units in general hospitals</p> <p>Intervention n=1623 Control n=1983</p> <p>50 weeks research plan</p> <p>Inclusion criteria: Age >60 years, projected length of stay of at least 3days, Mini-Mental State Examination score > 23/30, or an Abbreviated Mental Test score >7/10.</p> <p>Power analysis: yes</p> <p>Group Homogeneity: In general hospitals, eight publicly funded rehabilitation units that admit patients for rehab from disorders such as hip fractures or medical illness were selected.</p>	<p>Each Patient viewed digital video discs and received a workbook.</p> <p>Educators provided follow-up sessions, set goals to reduce fall risks for individualized patients, and completed written action plans.</p> <p>Staff got training in the first week of the intervention.</p>	<p>Dependent variable: Rate of falls and falls with injury</p> <p>Measures: Fall rate and fall injury per 1000 patient days are measured using data extracted from the hospital incident report system and auditing of patient notes.</p>	<p>Patients' fall rate decreased from 13.78 to 7.8 per 1000 patient days (P=0.003).</p> <p>Patients' fall injuries decreased from 4.75 to 2.63 per 1000 patient days (P= 0.006).</p> <p>The proportion of patients who were fallers decreased from 12/51% to 8.38 %.</p> <p>Individualized patient education programs combined with training and feedback to staff added to usual care reduce the rates of falls and fall injuries in older patients.</p>

Katsulis, Z., Ergai, A., Leung, W., Schenkel, L., Rai, A., Adelman, J., Benneyan, J., Bates, D. W., & Dykes, P. C. (2016). Iterative user centered design for development of a patient-centered fall prevention toolkit. <i>Applied Ergonomics</i> , 56, 117-126. https://doi.org/10.1016/j.apergo.2016.03.011					
Level VI					
Purpose/ Hypothesis	Design	Sample	Intervention	Outcomes	Results
<p>"The purpose of this manuscript is to describe the production of the final version of the paper Fall TI PS toolkit through the use of the user-centered design cycle" (Katsulis et al., 2016)</p> <p>"One aspect of the project aims to revise a paper version of the Fall TIPS toolkit. Since the original Fall TIPS solution required electronic decision support and complicated informatics expertise, a redesigned paper Fall TIPS toolkit with decision support will allow for broader adoption among hospitals that cannot implement the electronic solution" (Katsulis et al., 2016).</p>	Qualitative Descriptive study	<p>Sampling Technique: A convenient sample of nursing staff and patients from Women's Hospital (BWH) and Montefiore Medical Center (MMC).</p> <p>End users were nursing staff and patients from the adult oncology unit at BWH.</p> <p>Interviews with nursing staff were conducted with varying group sizes, ranging from 1-20 nurses</p> <p>Group Homogeneity: No Power analysis: No</p>	<p>Control: No Intervention: The nursing staff at Brigham and Women's Hospital (BWH) and Montefiore Medical Center (MMC) were observed workflow to study current practices related to fall prevention.</p> <p>End-users, including nursing staff and patients, were interviewed to gain insight into what should be included in the new paper tool.</p> <p>Icon content validity testing was done with nursing staff, nursing assistants, and patients.</p> <p>The icon that did not test well were revised until they received a score of 3 on a Likert scale (1 being strongly disagreed to 4 being strongly agreed)</p>	<p>Dependent variables: The usability of redesigned paper Fall TIPS toolkit</p> <p>Measure: The Paper form of TIPS toolkit usability was measured through usability survey questions on System Usability Scale 1 (strongly disagree) to 5 (strongly agree).</p> <p>The data were measured along with each group's mean, variance, and P-value.</p>	<p>Reported easy to use= (P<0.001)</p> <p>Reported preference over old tool= (P<0.001)</p> <p>Satisfaction with the tools to support the fall prevention process at the hospital: (P<0.001)</p> <p>The redesigned paper version Fall TIPS toolkit was easier to implement in practice.</p> <p>The toolkit enhanced end-user understanding of patient risk factors and tailored interventions.</p>

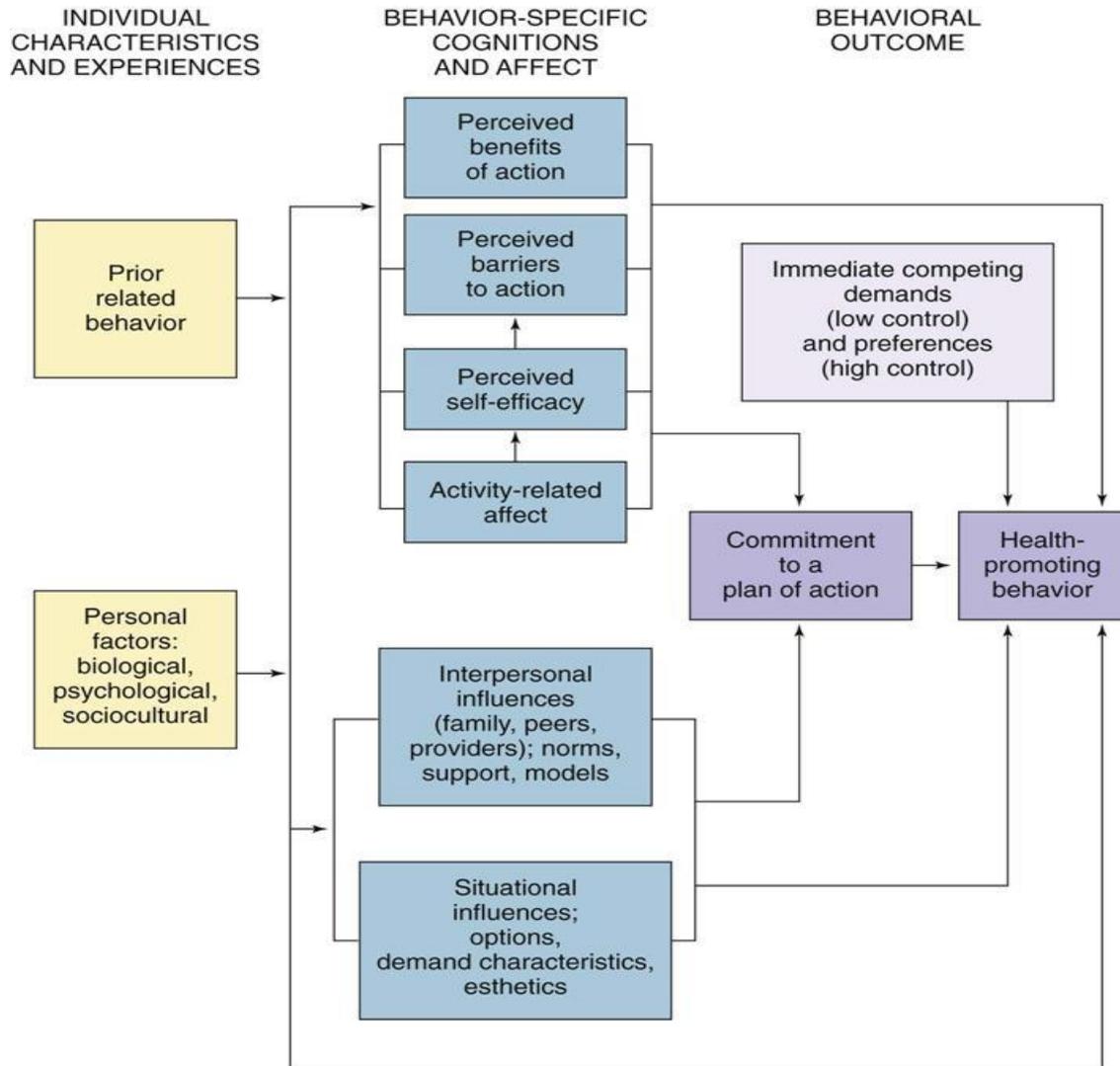
			<p>After the feedback, many prototypes were created. Then, more interviews were conducted with end-users and compared those prototypes.</p> <p>Comparison interviews were done concurrently with icon CVI (Content Validity Index) testing, and revised icons were added to each new prototype</p> <p>Structured usability testing was performed at BWH by end-users on the final prototype.</p> <p>End users were asked to complete both the old and new versions of the paper toolkit using a stimulated patient scenario.</p> <p>Users were asked to rate both tools using the System Usability Scale ranging from 1 (strongly disagree) to 5 (strongly agree).</p>		
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Table 2
Synthesis

Evidence-Based Practice Question (PICO): In patients in acute care Medical/surgical unit, does implementation of an evidence-based Fall TIPS (Tailoring Interventions for Patient safety) tool compared to usual care reduce the patient fall rate?			
Level of evidence	# of studies	Summary Findings	Overall Quality
II	2	<p>a) Hill et al. (2015) conducted a cluster-randomized study to examine the effectiveness of individualized falls-prevention education for patients. They concluded that individualized patient education programs combined with training and feedback to staff added to usual care reduce the rate of falls and fall injuries in older patients.</p> <p>b) Dykes et al. (2010) conducted a cluster-randomized study to investigate whether a fall prevention tool kit (FPTK) decreases patient fall in hospital. The researchers concluded that using a fall prevention tool kit (FPTK) in hospital units compared with usual care significantly reduced the rate of falls. Furthermore, the researchers concluded that the Fall TIPS was effective with patients age >64.</p>	<p>a) Good (B): Adequate power, randomization, and a control design strengthened internal validity. Results were reasonably consistent, and conclusions were definitive. The sample size was adequate. However, the patients were selected from acute care hospital rehab, decreasing the generalizability to other settings.</p> <p>b) Good (B): The study was conducted in four urban hospitals with 10,264 samples. The study had adequate control; power analysis was done. Group homogeneity was maintained. The result was consistent, and the conclusion is definitive. The recommendation is clear.</p>
IV	2	<p>a) Christiansen et al. (2020) conducted a study to examine the Fall TIPS program's impact on patient activation. The researchers concluded that patients with access to the Fall TIPS program are more activated and engaged in their fall prevention plan. Furthermore, the researchers recommended that the care team members should engage patients in their fall prevention plan to increase their knowledge, skill, and confidence.</p> <p>b) Duckworth et al. (2019) found that each Fall TIPS modality effectively helps patient engagement in the 3-steps fall prevention process of conducting fall risk assessments, developing a tailored fall prevention plan, and consistently implementing the plan.</p>	<p>a) Good (B): Reasonably through appropriate search, small sample size, no power analysis, adequate control. Fairly definitive conclusion, reasonably consistent recommendations.</p> <p>b) Good (B): Inclusion criteria only English or Spanish speaking and age >17 years. It could have selection bias. Had some control. Overall, the result is significant, and the recommendation is clear.</p>

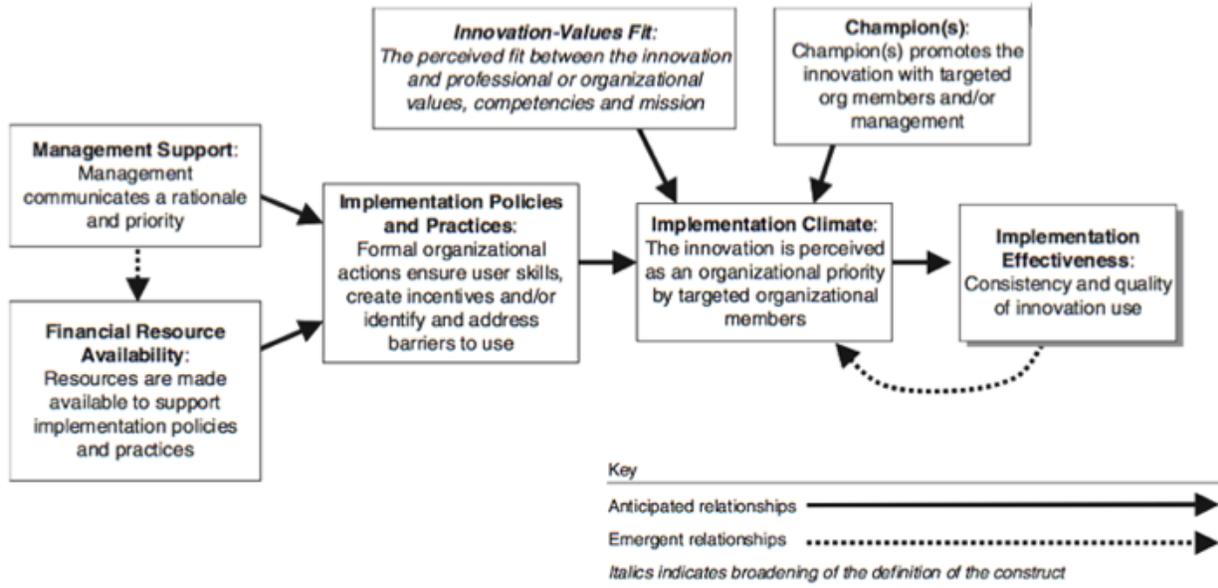
<p>V</p>	<p>2</p>	<p>a) Dykes et al. (2017) found that strategies to implement the laminated/ paper Fall TIPS tool successfully are: engaging hospital and clinical leadership, practice council champions, super users, and overcoming barriers such as lack of awareness, lack of familiarity, lack of agreement, lack of self-efficacy, lack of outcome expectancy, the inertia of previous practice, and external barriers.</p> <p>b) Ayton et al. (2017) found that barriers to fall prevention programs are lack of resources, champions, training, a belief that falls are inevitable, limited knowledge of fall prevention, and complex patient management. Successful falls prevention program implementation in acute hospital wards require a multifaceted planned approach that includes regular practical face-to-face education and training for nurses, provision of equipment, audit, reminders, and feedback; leadership and champions; and fall data provision</p>	<p>a) Good (C); Pilot study, no randomization. Well-defined methods. Reasonably thorough and appropriate search, reasonably consistent result, definitive conclusions.</p> <p>b) Good (C): Expertise seems to be credible. Reasonably and appropriately search. A conclusion can be drawn, however no randomization and no power analysis.</p>
<p>VI</p>	<p>1</p>	<p>Katsulis et al. (2016) found that the redesigned paper version Fall TIPS toolkit with decision-support allowed for broader adoption among hospitals that cannot implement the electronic versions. In addition, the redesigned paper version toolkit was also easier to implement.</p>	<p>Good (B): Experts seem credible, well-defined process, consistent result, a conclusion can be drawn.</p>

Figure 1
Health Promotion Model



Source: *Health Promotion Model* (Nursekey.com, 2016).

Figure 2
 Conceptual Framework of Complex Innovation Implementation



Source: Helfrich et al. (2007).

Figure 3
Staff Education Completion

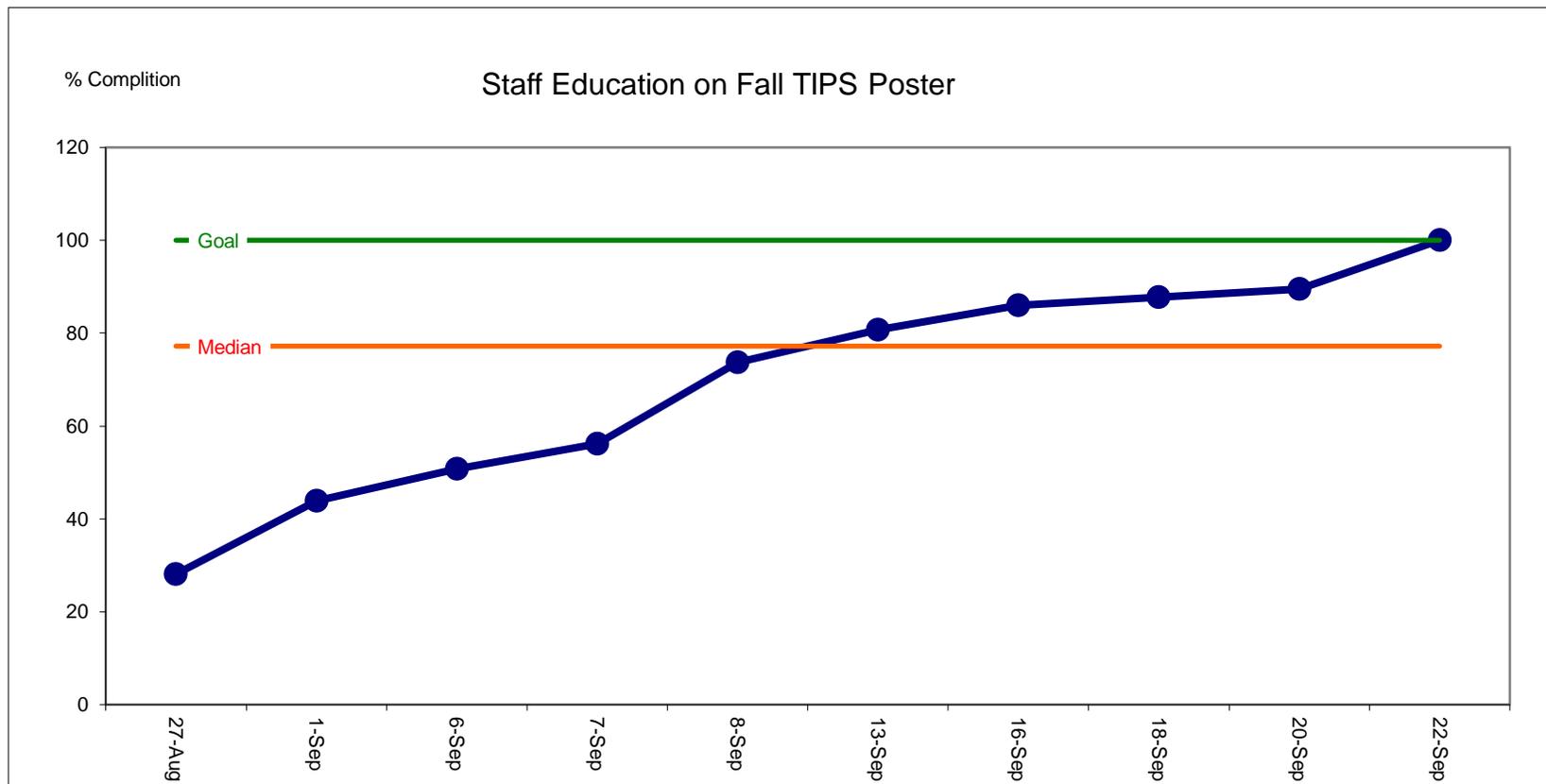


Figure 4
Staff Adherence on Fall TIPS

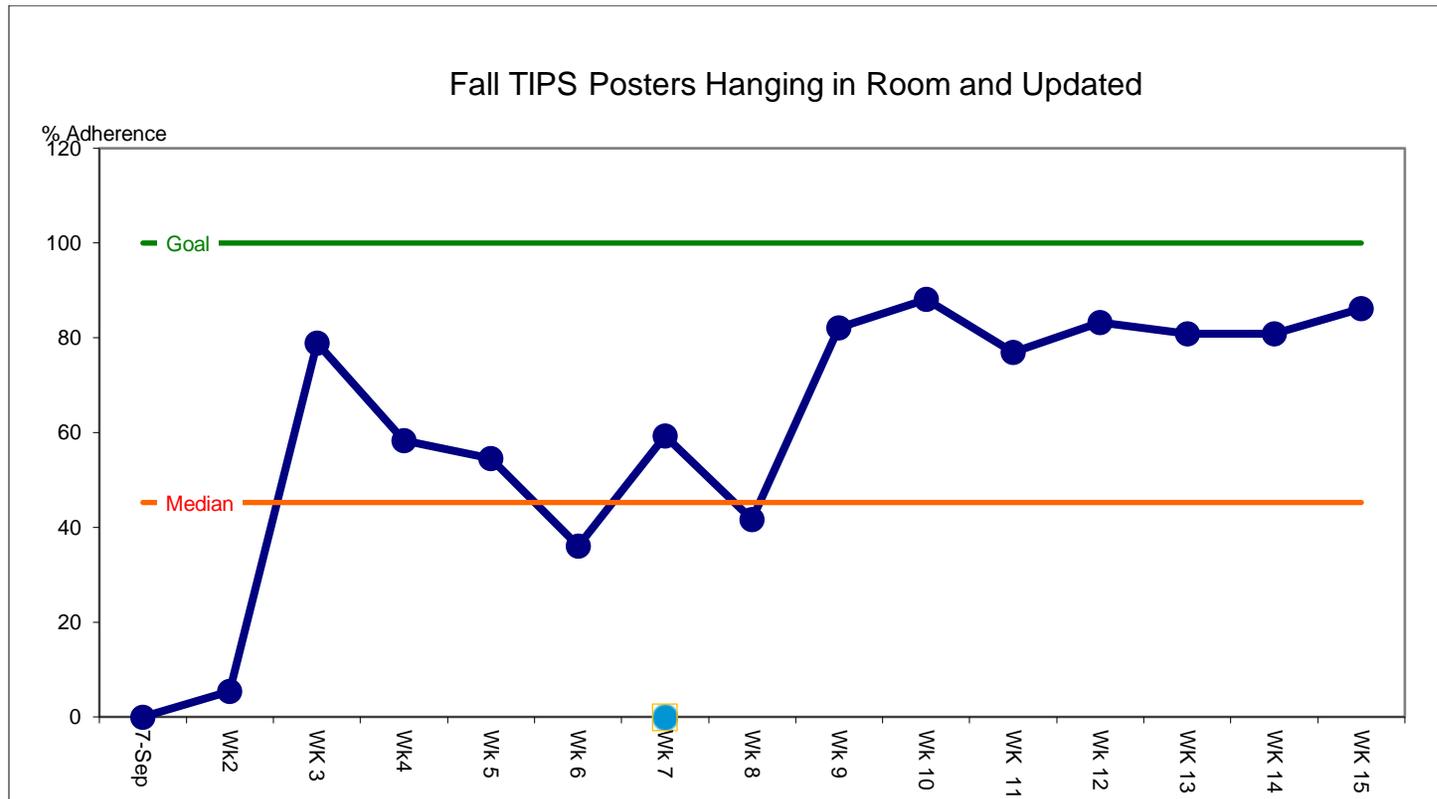


Figure 5
 Patients' Knowledge on Fall Risk Factors

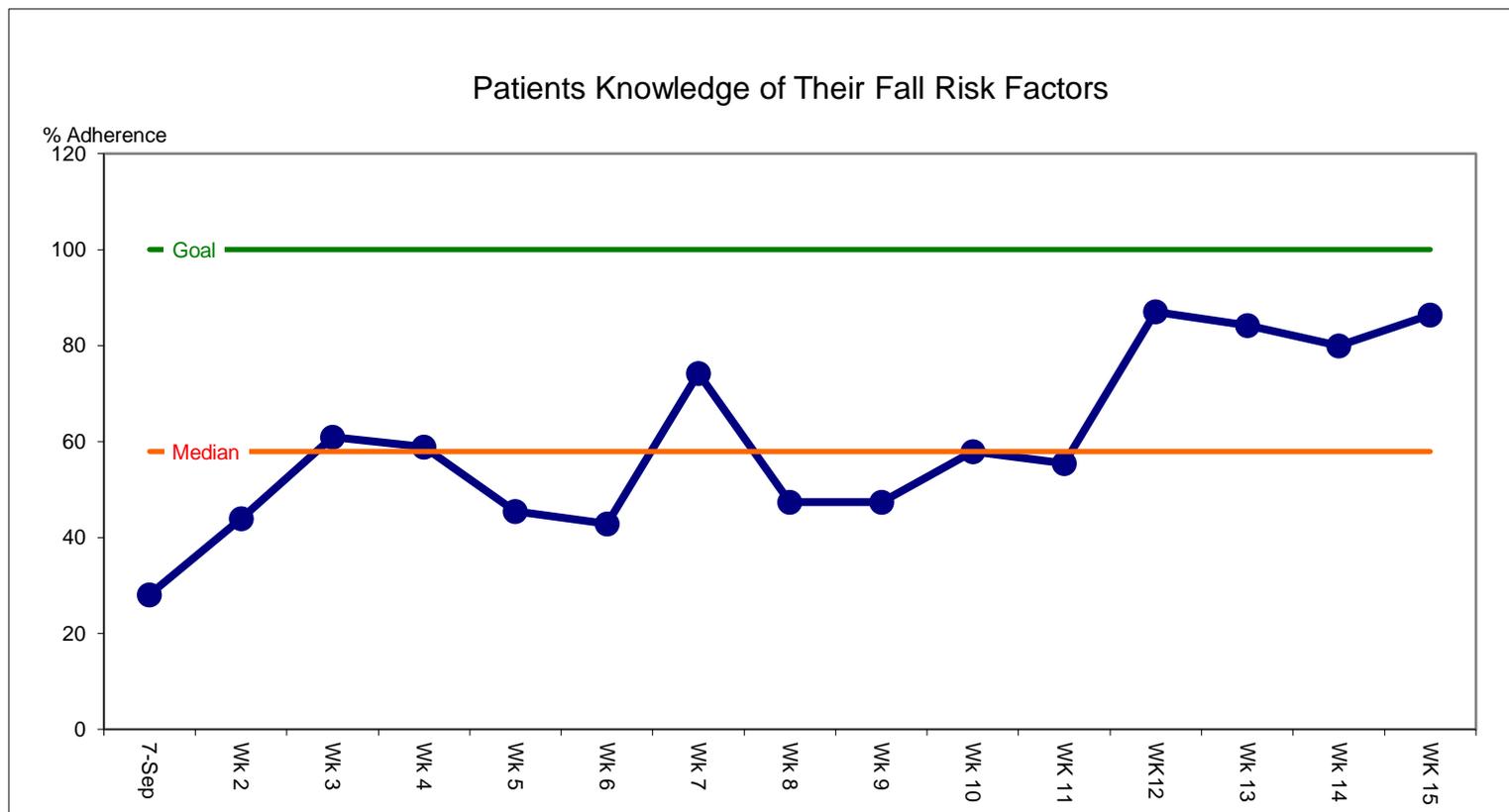


Figure 6
Patients' Knowledge on Tailored Intervention Plan

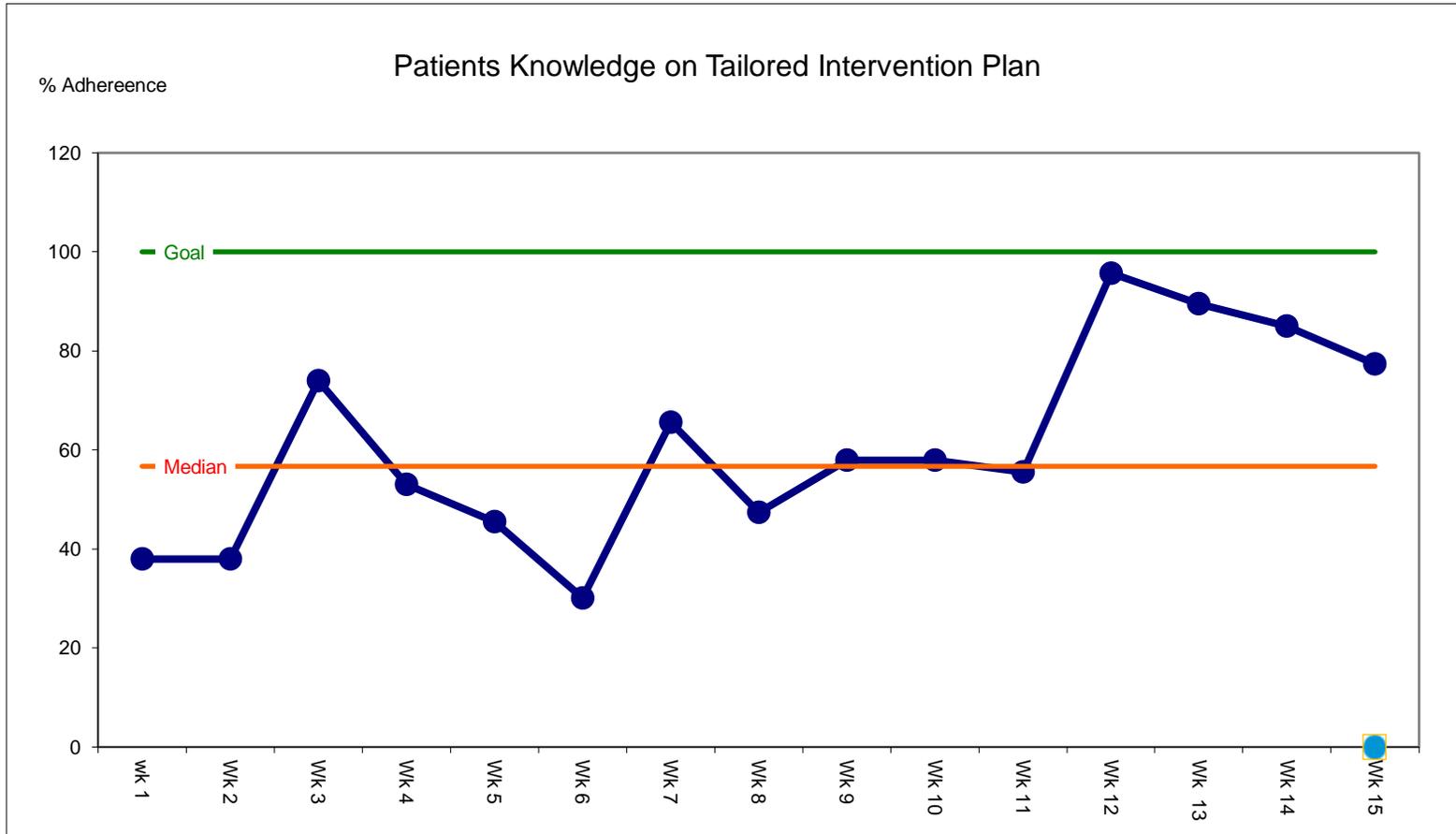


Figure 7
Unit Patients Fall

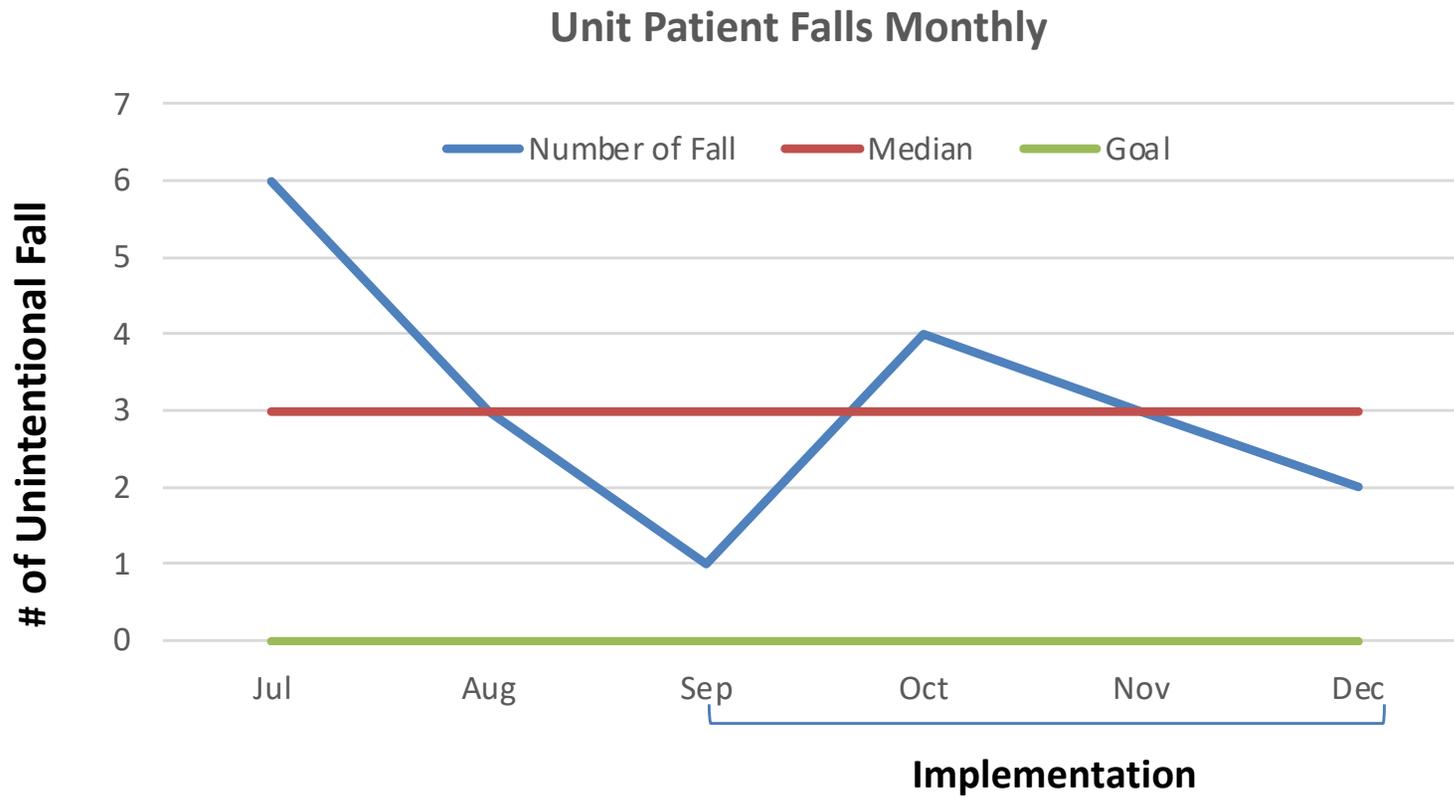


Figure 8
Fall TIPS Weekly Audit Result

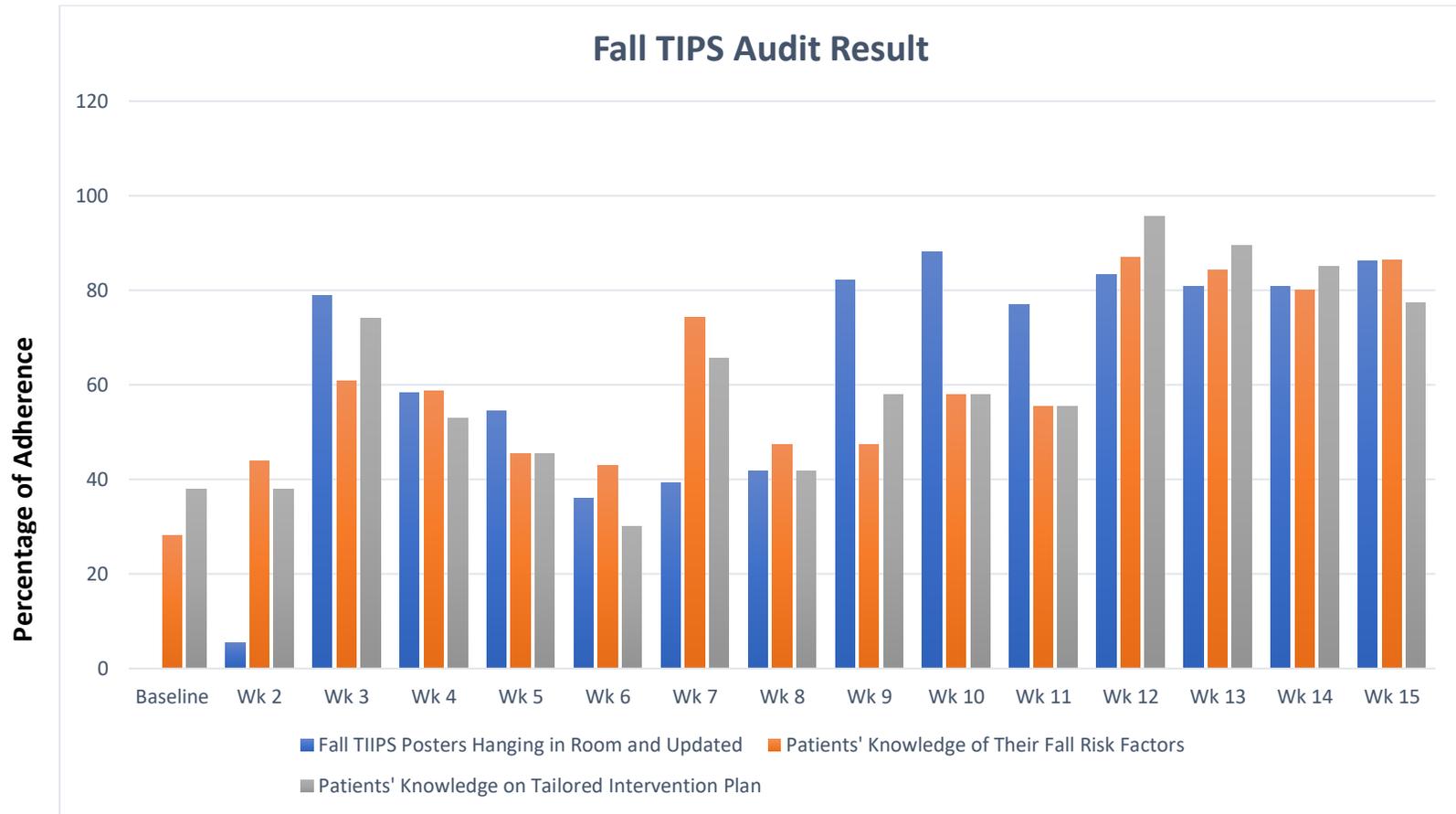
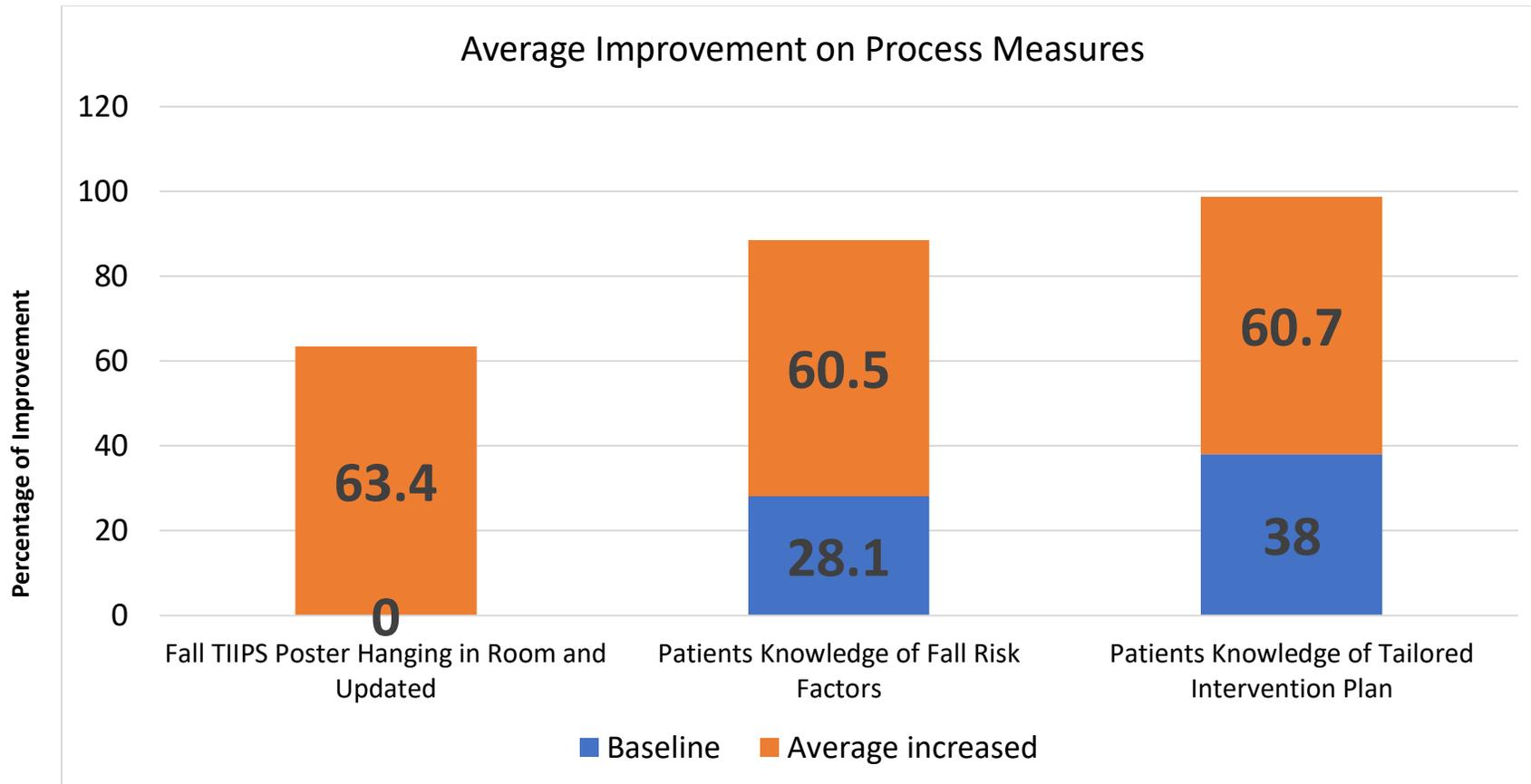


Figure 9
Average Improvement on Process Measures



Appendix A
Laminated Falls TIPS Tool

 BRIGHAM HEALTH BRIGHAM AND WOMEN'S Faulkner Hospital		Patient Name: _____		Date: _____	
 Increased Risk of Harm If You Fall <input type="checkbox"/>		Fall Interventions <i>(Circle selection based on color)</i>			
Fall Risks <i>(Check all that apply)</i>		Communicate Recent Fall and/or Risk of Harm  		Walking Aids    Crutches Cane Walker	
 History of Falls <input type="checkbox"/>		IV Assistance When Walking 		Toileting Schedule: Every _____ hours    Bed Pan Assist to Commode Assist to Bathroom	
 Medication Side Effects <input type="checkbox"/>		Bed Alarm On 		Assistance Out of Bed    Bed Rest 1 person 2 people	
 Walking Aid <input type="checkbox"/>		IV Pole or Equipment <input type="checkbox"/>			
 Unsteady Walk <input type="checkbox"/>		May Forget or Choose Not to Call <input type="checkbox"/>			
					

Fall TIPS ©Brigham & Women's Hospital 2016; do not alter without written permission.

Appendix B

Fall Prevention Knowledge Pre and post-test with Answer

Fall Prevention Knowledge Pre-Test and Post-Test		
Please mark whether you believe the statements below to be true (T) or false (F).		
Item	T	F
1. Bedside nurses know their patients and are better than a standardized screening scale at identifying patients likely to fall.		
2. A fall risk screening scale identifies those patients who are likely to fall because they have one or more physiological problems.		
3. The 3-step fall prevention process is comprised of 1) screening for fall risks, 2) developing a tailored fall prevention plan, 3) completing fall prevention documentation.		
4. When nurses communicate with patients about their increased risk for injury if they fall, this improves the likelihood that patients will follow their personalized fall prevention plan.		
5. Patients at low risk for falls do not require a fall prevention plan.		
Fall Prevention Knowledge Pre-Test and Post-Test Answers		
Item	T	F
1. Bedside nurses know their patients and are better than a standardized screening scale at identifying patients likely to fall.		F
2. A fall risk screening scale identifies those patients who are likely to fall because they have one or more physiological problems.	T	
3. The 3-step fall prevention process is comprised of 1) screening for fall risks, 2) developing a tailored fall prevention plan, 3) completing fall prevention documentation.		F
4. When nurses communicate with patients about their increased risk for injury if they fall, this improves the likelihood that patients will follow their personalized fall prevention plan.	T	
5. Patients at low risk for falls do not require a fall prevention plan.		F

