Falls prevention strategies for adult inpatients in a university hospital of São Paulo, Brazil: a best practice implementation project

Flávia de Oliveira Motta Maia[1,3] • Diná de Almeida Lopes Monteiro da Cruz[2,3] • Gilceria Tochika Shimoda[1,3] • Karina Sichieri[1,3] • Luciana Inaba Senier Iida[1]

[1]University Hospital of the University of São Paulo, São Paulo, Brazil, [2]Nursing School, University of São Paulo, São Paulo, Brazil, and [3]The Brazilian Centre for Evidence-informed Health Care: a Joanna Briggs Institute Centre of Excellence

ABSTRACT

Objectives: The main objective of this project was to reduce the incidence and harm from falls that occur among patients admitted in the acute Internal Medicine Unit and Intensive Care Unit in a public teaching hospital in São Paulo, Brazil.

Introduction: Falls are a challenge for health professionals and healthcare services as they may result in high-impact outcomes for patients, such as functional decline, increase in length of hospital stay, increase in the cost of healthcare services, and death. In an attempt to promote safe care the World Health Organization (WHO) launched the World Alliance for Patient Safety in 2004 that encourages the adoption of best practice to reduce adverse events in healthcare services.

Methods: The project used the Joanna Briggs Institute Practical Application of Clinical Evidence System (JBI-PACES) and Getting Research into Practice (GRiP) audit tool for promoting change in health practice. A baseline audit was conducted measuring eight best practice criterias, followed by the implementation of target strategies and a follow-up audit.

Results: The results of the baseline audit identified large gaps between current practice and overall compliance with best practice. The GRiP module helped identify strategies related to education programs for patients, families and nursing teams, and a falls risk assessment with an accurate tool to address the gaps in compliance. The follow-up audit cycle was satisfactory as all best practice audit criteria showed an improvement as an aggregated result.

Conclusions: The project used the audit and feedback strategy to translate evidence into practice. Some of the measured criteria improved to moderate-high compliance with best practice. The results showed that implementation of evidence-based practice leads to an improvement in falls prevention. Future audits are required to sustain improvements.

Keywords Accidental falls; acute inpatients; intensive care units; adult; aged

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Introduction

Falls are a challenge for professionals and health care services as they may result in high-impact outcomes for patients, such as functional decline, increase in length of hospital stay, and increases in the cost of healthcare services.[1] Damage resulting from falls can affect 30% to 50% of patients, and around 44% of falls are considered serious and can lead to death.[2]

Risk factors for falls in hospitals are similar to those that occur in the community and are related to age, history of falls, cognitive impairment, impaired balance, visual impairment, use of some classes of medications, changes in medication use and environmental hazards.[3] The most common risk factors associated with falls of the elderly in hospitals are confusion and psychomotor agitation, urinary incontinence, history of falling, and use of psychotropic medications.[3] In hospitals, in addition to the

Correspondence: Flávia de Oliveira Motta Maia, flamaia@usp.br
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elderly,[3] other patients are vulnerable to falls, such as those who have had recent diagnoses of ischemic stroke and cancer,[1] and patients hospitalized in neurology and rehabilitation units.[2] Extrinsic factors such as the hospital environment itself, therapeutic procedures and the use of multiple medications can also contribute to the occurrence of falls.[2]

In an attempt to promote safe care, the World Health Organization (WHO) launched in 2004 the World Alliance for Patient Safety aimed at effective reduction of adverse outcomes for patients and called for a concerted international effort in which WHO would play a proactive leadership role. Its program activities included investigating how countries and organizations classify, measure, report and attempt to prevent adverse events, and establishing a comprehensive evidence base for these practices.[4]

Patient Safety International Goals were proposed by WHO and Joint Commission International in 2007 to encourage the adoption of best practice to reduce adverse events in health care services, with the prevention of falls of patients placed prominently among the first six goals.[5]

To develop safety programs that include the prevention of falls, it is critical that a safe culture is promoted in healthcare services that recognizes the seven safety subcultures: leadership, teamwork, communication, learning from mistakes, justice, patient-centered care and evidence-based practice (EBP).[6,7] The use of EBP as a safety subculture aims to reduce preventable complications by using the best practice interventions of effectiveness. However, translating an effective intervention is a challenge that requires identifying the key components that make the intervention effective, translating these components into a program, implementing a pilot program, evaluating the results, refining the program and implementing it in a setting.[8]

The evidence showing that the implementation of best practice contributes to a reduction in patient adverse events, leading to health managers increasing the number of trained professionals and clinical leaderships in the institutions so that they may initiate care processes that promote the development and use of EBP.[7] In this regard, the use of evidence for the prevention of falls has been highly recommended and many studies have been conducted to verify which measures are really effective; in addition, systematic reviews are available, summarizing the body of evidence.[1,3,9-13]

The Joanna Briggs Institute (JBI) is a research and development organization committed to promote evidence-based practice globally. The JBI's approach to evidence-based healthcare is unique and incorporates decision-making that considers the feasibility, appropriateness, meaningfulness and effectiveness of healthcare practices.[14,15]

The institute's mission is to facilitate the implementation of the best available evidence in healthcare practices. In accordance with the stated mission, JBI has developed resources to facilitate the use of the best available evidence by clinicians.[15] Grades of Recommendations are used to assist healthcare professionals when implementing evidence inpractice. The institute currently assigns a Grade of Recommendation to all recommendations available through its resources. Grade A is a strong recommendation and Grade B is a weak recommendation for certain health management strategies.[16]

Evidence-based recommended practices on preventive interventions of falls are:[13,17-30]

- Consideration must be given to the physical environment, hospital culture and care processes, and the use of technology when implementing multifaceted fall prevention approaches within hospital settings. (Grade A)
- Multidisciplinary multifactorial programs, education packages for patients and families, and targeted risk factor reduction plans are recommended in fall prevention approaches. (Grade A)
- In-hospital patients who have already fallen should undergo post-fall assessment and should be considered as high-risk for future falls. (Grade A)
- Best practice for fall prevention includes: i) environmental considerations such as flooring, lighting, observation, signposting, furniture, footwear; ii) identifying modifiable fall risk factors; iii) implementing interventions targeting modifiable risk factors; and iv) interventions to help decrease risk of injury to patients who fall. (Grade A)
- Multicomponent fall prevention strategies including use of a validated fall risk assessment tool, staff and patient education, bedside signs and wristband alerts, footwear review, scheduled and supervised toileting, and medication review are all recommended for implementation. (Grade A)
- Common factors of ''successful'' multicomponent interventions include leadership support, involvement of frontline clinical staff to act as

"change champions", multidisciplinary team input, pilot-testing interventions, and engagement of all staff to ensure buy-in of the intervention goals. (Grade A)

- Falls risk assessment tools, such as the Morse Fall Scale and the STRATIFY scale, can be recommended to assist in the prevention of falls in hospital settings. (Grade B)

In Brazil, the National Patient Safety Program (NPSP) was established in 2013, with the overall objective to "contribute to the improvement of health care in all health facilities of the country".[31(para.14)] Among the strategies for the implementation of the NPSP, six protocols were developed with actions to be undertaken by the healthcare services, one of which is the Falls Prevention Protocol. Its main purpose is to "reduce the occurrence of patients' falls in health care facilities and the damage resulting therefrom by implementing measures that address the assessment of patient risk, ensure the multidisciplinary care in a safe environment, and promote education of patients, families and professionals".[2(p.1)]

The University Hospital of the University of São Paulo (HU-USP) is a state-owned public teaching hospital with a secondary complexity level. It has an installed capacity of 236 beds and currently has 178 active beds. It is located in the western region of São Paulo, Brazil, serving the USP community and also an estimated population of more than 500,000 inhabitants and users of the National Health System (Sistema Único de Saúde – SUS).

From January 2014 to December 2015, 196 falls of inpatients were registered at HU–USP, indicating an average of 8.2 falls/month. The falls occurred more frequently in the Internal Medicine Unit (IMU) (45.9%) and were characterized as "falls from standing height" (71.1%), followed by "falls from the bed" (13.3%). Among the causes and general risk factors attributed to the events, the most common were elderly patients (33.3%), gait impairments (16.6%) and environment factors (13.3%). Of the total falls in this period, 18.8% required therapeutic intervention. The other adult units in the HU-USP, sub-acute patients admitted into the Intensive Care Unit (ICU), also contributed to the increase of the incidence of falls.

Considering that falls occur frequently at HU-USP, even with the use of preventive measures imposed by protocol, this evidence-based best practice implementation project aimed to reduce the incidence of falls in acute inpatients through the use of the JBI Practical Application of Clinical Evidence System (JBI-PACES) audit and feedback tool. The audit criteria used in this project were derived from JBI best practice recommendations on the preventive interventions for falls.

Aims and objectives

The aim of this evidence implementation project was to promote evidence-based practice in the prevention of falls among IMU and ICU inpatients in a public teaching hospital in São Paulo, Brazil, and thereby improve patient outcomes and resource utilization. By implementing evidence-based practice, the objectives were:

- To identify and engage a multidisciplinary team to foster evidence-based practice in the prevention of falls, and to undertake assessment of compliance with best practice, risk assessment and prevention of falls among adults and older adults using a baseline audit and an audit tool developed by JBI.
- To analyze the results from the baseline audit, and design and implement strategies to address areas of non-compliance with best practice regarding prevention of falls among adults and older adults.
- To undertake a follow-up audit, assess the extent and nature of increased compliance with evidence-based best practice, and identify areas and strategies to sustain and enhance care in delivery of risk assessment and prevention of falls among adults and older adults in the IMU and ICU.

Methods

This evidence implementation project used JBI-PACES and Getting Research into Practice (GRiP) audit and feedback tool which involves three phases of activity:

i) Establishing a team for the project and undertaking a baseline audit based on criteria informed by the evidence.
ii) Analyzing the results of the baseline audit and designing and implementing strategies to address non-compliance found in the baseline audit informed by the GRiP framework.
iii) Conducting a follow-up audit to assess the outcomes of the interventions implemented to

improve practice, and identify future practice issues to be addressed in subsequent audits.

This project was approved by the Ethics Committee of the Nursing School of the USP (EEUSP) (52032515.9.0000.5392) and HU-USP (52032515.9.3001.0076), and was conducted in accordance with Resolution 466, December 2012, of the Brazilian Health Council,[32] which approves the regulatory guidelines and standards for research involving human beings in Brazil.

Phase 1: Team establishment and baseline audit

The project team comprised the Director of Clinical Nursing Division, a faculty member of the EEUSP and the Nursing Chief of Quality Services. They were responsible for the design and implementation of the project and developing the associated tools and strategies for the project.

The audit team comprised the baccalaureate nurses of Quality Services and nurses of the Patient Safety Group who were responsible for the audit process and the training program.

Relevant key stakeholders were the Nursing Chief of IMU and ICU who were responsible for the supervision of the best implementation program and gave feedback to the nurse team.

Table 1 shows the evidence-informed audit criteria used in the project (baseline and follow-up audits) together with a description of the sample and approach to measuring compliance with best practice for each audit criterion.

Setting and sample size

The project was developed in the IMU and ICU of HU-USP. The IMU has 35 beds (14 beds for high-dependency nursing care and 21 beds for intermediate nursing care). It caters to individuals of both sexes over 18. The mean stay is ten days and the average occupancy rate is greater than 85%. The nursing staff comprises a nursing chief, 13 baccalaureate nurses and 35 nursing technicians.

The ICU has 12 beds (eight beds for critical care and four beds for subacute care). The mean stay is 6.5 days and the average occupancy rate is greater than 90%. The nursing staff comprises a nursing chief, 17 baccalaureate nurses and 28 nursing technicians.

In both units the working time is 36 hours a week, distributed in six-hour daytime shifts and 12-hour night shifts. The nursing chief has management and teaching duties, while baccalaureate nurses are responsible for the planning of the nursing process for inpatients, distribution and supervision of activities for nursing technicians, conducting procedures that are specific to the scope of practice of baccalaureate nurses, and teaching activities for undergraduate students and nursing residents. Nursing technicians perform nursing activities prescribed by baccalaureate nurses in the patient's care plan.

In this project, in relation to criteria 1, 2, 3, 4, 5, 7 and 8, the sample included adult and older adult inpatients of the IMU and ICU. For criterion 6, the sample comprised nursing staff of the IMU and ICU as well. Nurses or technicians on work or sick leave were excluded.

Table 1: Audit criteria, sample and measurement compliance with best practice

Audit criterion	Sample	Method used to measure % compliance with best practice
1. Fall risk assessment is done upon admission	The baseline audit sample: IMU: 72 patients ICU: 22 patients Follow-up audit sample: IMU: 48 patients ICU: 18 patients	This criterion was considered as 'YES' if the clinical record showed a risk assessment completed within 12 hours of admission.
2. Fall risk assessment is done upon transfer	The baseline audit sample: IMU: 72 patients ICU: 22 patients Follow-up audit sample: IMU: 48 patients ICU: 18 patients	This criterion was considered as 'YES' if the clinical record for patients that had been transferred (intra-hospital transfer) showed a risk assessment completed within 12 hours of transfer.

Table 1. (*Continued*)

Audit criterion	Sample	Method used to measure % compliance with best practice
3. Reassessment occurs when there is a change in condition or following a fall	The baseline audit sample: IMU: 72 patients ICU: 22 patients Follow-up audit sample: IMU: 48 patients ICU: 18 patients	This criterion was considered as 'YES' if the clinical record for patients who had a change in condition that affected their falls risk status or experienced a fall included reassessment performed within 12 hours of this event.
4. Patients who have experienced a fall are considered at high risk for future falls	The baseline audit sample: IMU: 72 patients ICU: 22 patients Follow-up audit sample: IMU: 48 patients ICU: 18 patients	This criterion was considered as 'YES' if the clinical record for patients who had a history of falls were assessed as high risk for future falls, according to the risk assessment.
5. Fall risk assessment is done accurately using a falls assessment tool	The baseline audit sample: IMU: 72 patients ICU: 22 patients Follow-up audit sample: IMU: 48 patients ICU: 18 patients	This criterion was considered as 'YES' if the clinical record showed that a risk fall assessment with the Morse Fall Scale was used for patients categorized as at-risk of falls on admission, who developed clinical changes that led to the risk, or had experienced falls during hospitalization.
6. Healthcare professionals have received education regarding falls assessment and prevention strategies	The baseline and follow-up audit sample: IMU: 14 baccalaureate nurses and 35 nursing technicians ICU: 18 baccalaureate nurses and 28 nursing technicians	The criterion was considered as 'YES' if staff members in the participating ward reported that they had received education in the last year. Question: "Have you received education regarding falls prevention strategies a year ago?"
7. Patient and family education is carried out for patients at risk of falls	The baseline audit sample: IMU: 72 patients ICU: 22 patients Follow-up audit sample: IMU: 48 patients ICU: 18 patients	This criterion was considered as 'YES' if, for patients at risk of falls, patient and family education was documented in the case notes as having been done
8. Targeted interventions are implemented according to risk factors	The baseline audit sample: IMU: 72 patients ICU: 22 patients Follow-up audit sample: IMU: 48 patients ICU: 18 patients	This criterion was considered as 'YES' if it was documented in nursing records for patients assessed as at-risk that there had been implementation of targeted interventions to address identified risk factors. Targeted interventions related to key risk factors and levels of risk for falls were selected and included in the 'Falls Prevention Protocol' and the electronic documentation system of the nursing process during assessment, diagnosis, outcome and nursing interventions. The adjustment made was the application of a standardized and validated tool for assessing the risk of falls, choosing the most appropriate interventions according to the risk assessment and the evaluation of the relevant risk factors, for example, patients with pre-existing falls to be identified as at-high-risk of falls, using visual alerts in the yellow code (bracelet and risk of falling plate next to their beds), indicating the risk of falls.

IMU, Internal Medicine Unit; ICU, Intensive Care Unit.

Baseline audit

The baseline audit was conducted before the best practice implementation to measure current compliance to best practice recommendations in the prevention of fall among adults and older adults.

Data was collected by the implementation team over one month in the IMU (October 2016) and 15 days in the ICU (March 1–15, 2017). An audit tool was used to collect data and is shown in Appendix I. To assess the compliance of each audit criterion (1, 2, 3, 4, 5, 7

and 8), the clinical records of 72 medical (IMU) and 22 medical (ICU) inpatients were examined. To assess the compliance for criteria 6 on nurse team education, 40 nurses and nursing technicians from the IMU were interviewed and 46 nurses and nursing technicians from the ICU were interviewed. The report of the baseline audit is presented in Figure 1.

Phase 2: Design and implementation of strategies to improve practice (GRiP)

The baseline audit data were collected for analysis using JBI-PACES. The project team discussed the baseline audit results to identify areas for improvement and their barriers, and to develop strategies to overcome the identified barriers. Recognizing the importance of different points of view, the team aggreed to conduct meetings with the nursing staff of the IMU to discuss the topic of patient falls. The aims of the meeting were: i) to raise nursing staff awareness about the preventability of the patient falls; ii) to raise the nursing staff awareness about the need to improve the practices of fall prevention according to the best available evidence; iii) to obtain the perspectives of nursing staff on the contributory factors for the occurrence of falls in the hospital; iv) to obtain the perspectives of nursing staff on the barriers to best practice on falls prevention: and v) to obtain nursing staff's suggestions of strategies to overcome the barriers. All members of the nursing staff participated in the one-hour face-to-face meeting held in small groups and scheduled to allow participation by all staff during their shifts. The meeting sessions started with a video presentation focusing on teamwork, followed by a discussion on patient falls elicited by the questions: "what factors contribute to patient falls in the ward?" "what are our strengths, weaknesses, opportunities and threads on preventing patient falls?". During the sessions, the facilitator, a member of the project team, presented relevant information on falls prevention, including the incidence rates at the ward level.

From the results of the initial audit, IMU nursing staff group meetings, and meetings with key stakehorders of the ICU, the project team listed the barriers and strategies to overcome them, and aggreed to an action plan formally documented within the GRiP framework (see Table 2), incorporating:

i) *Education of nursing staff:*
The initial audit showed that the nursing staff had not received any formal training on the prevention of falls in the preceding year (Figures 1 and 2, criterion 6). Lack of training and knowledge on updates to the institutional protocol on falls prevention also affected low compliance with other criteria, as all required up-to-date information to be delivered.
The following actions were suggested as a potential solution to this barrier:
- Lectures on falls prevention for all nursing staff in October and November 2016 in the IMU and April 2017 in the ICU, with 40-minute classes to cover the practices based on the best available evidence and the difficulties encountered in daily practice, as identified by the team during the session on group dynamics.
- Update of the institutional Falls Prevention Protocol with best practice recommendations[13,17-30] and making the contents available online through an icon on the desktop of all computers at the IMU.
- Update of the electronic documentation system for the nursing process in order to optimize the work of the team, with information based on best practice and consistent with the lectures and the Falls Prevention Protocol.

ii) *Assessment of the risk of falls with standardized and validated instruments:*
The initial audit showed that no standardized and validated instrument had been used for the assessment of the risk of falls made by the nursing staff. This may result in inappropriate decisions about the degree of risk for the patients and affect the choice of appropriate actions for the prevention of falls.
To overcome this barrier, the Morse Fall Scale was adopted, as it has been translated and culturally adapted for use in Brazil.[33] Furthermore, it is recommended for its easy metrics and applicability. From October 2016, the Morse Fall Scale was incorporated into the Falls Prevention Protocol, the electronic documentation system of nursing process, and updated lessons on the prevention of falls.

iii) *Education of patients and families:*
The initial audit showed that only 5% and 17% of patients and their families received information on prevention of falls by nursing staff at the IMU and ICU, respectively. Lack of knowledge

on this topic may have contributed to the persistent negative attitude of patients, the lack of engagement for change, or the poor adherence to preventive strategies.

To overcome this barrier, a clear and easy-to-understand leaflet was produced containing objective information on the prevention of falls during hospitalization. Recommendations were included on the basis of the best evidence and the most common problems identified by nursing staff during the group dynamics. The graphic and visual content was developed in partnership with the Communication Center of the HU-USP. The printed material was made available from November 2016 to the nursing staff of the IMU and ICU for distribution among patients or families within the first 24 hours of admission.

Phase 3: Follow-up audit after implementation of change strategy

The objectives of the follow-up audits were to assess whether there had been an improvement in compliance with best practice and identify areas where further improvements were required. The same eight audit criteria were used for the follow-up audit cycle.

Data was collected by implementation team over one month (December 2016) in the IMU and 15 days (May 1–15 2017). However, the sample size was reduced to 48 clinical records due to the decrease in the number of admissions during the period of Christmas and New Year in IMU. In the ICU, the sample was reduced to 18 clinical records. There were no variations to the number of nurses educated in ICU, but the number of nurses and technicians educated in IMU decreased due to work or sick leave.

The follow-up data was entered into JBI-PACES and data analysis comparing follow-up results with those of the baseline audit was undertaken to examine any change in compliance rates.

Results

Phase 1: Baseline audit

The results of the baseline audit in the IMU (see Figure 1) identified that only criterion 4 had a high compliance with best practice (100%), and two criteria had compliance between 67% and 61% (criteria 1 and 8, respectively) and five criteria had compliance rates ranging from 0% to 45% (criteria 2, 3, 5, 6 and 7).

Criteria legend

1. Fall risk assessment is done upon admission. (72 of 72 samples taken)
2. Fall risk assessment is done upon transfer. (72 of 72 samples taken)
3. Reassessment occurs when there is a change in condition or following a fall. (72 of 72 samples taken)
4. Patients who have experienced a fall are considered at high risk for future falls. (72 of 72 samples taken)
5. Fall risk assessment is done accurately using a falls assessment tool. (72 of 72 samples taken)
6. Healthcare professionals have received education regarding falls assessment and prevention strategies. (40 of 40 samples taken)
7. Patient and family education is carried out for patients at risk of falls. (72 of 72 samples taken)
8. Targeted interventions are implemented according to risk factors. (72 of 72 samples taken)

Figure 1: Baseline compliance with best practice for audit criteria (percentage) in the Internal Medicine Unit (%)

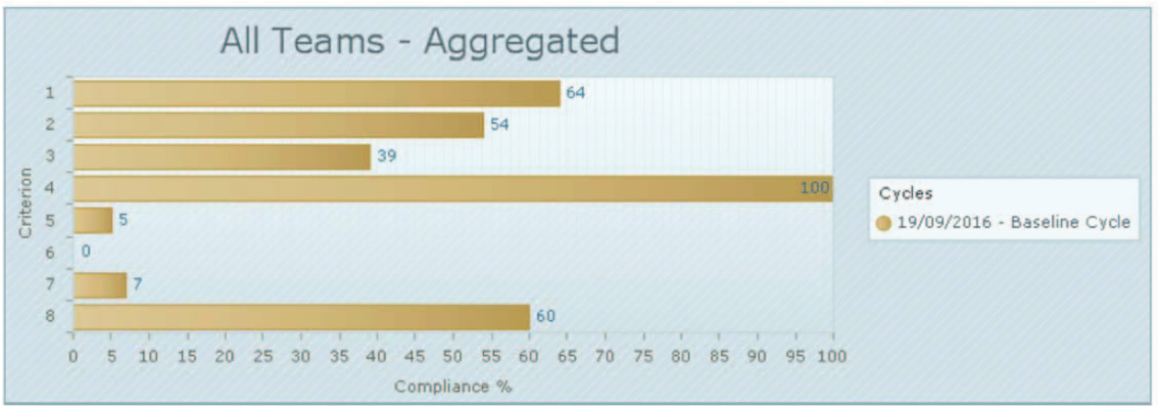
Criteria legend

1. Fall risk assessment is done upon admission. (22 of 22 samples taken)
2. Fall risk assessment is done upon transfer. (22 of 22 samples taken)
3. Reassessment occurs when there is a change in condition or following a fall. (22 of 22 samples taken)
4. Patients who have experienced a fall are considered at high risk for future falls. (22 of 22 samples taken)
5. Fall risk assessment is done accurately using a falls assessment tool. (22 of 22 samples taken)
6. Healthcare professionals have received education regarding falls assessment and prevention strategies. (46 of 46 samples taken)
7. Patient and family education is carried out for patients at risk of falls. (22 of 22 samples taken)
8. Targeted interventions are implemented according to risk factors. (22 of 22 samples taken)

Figure 2: Baseline compliance with best practice for audit criteria in the Intensive Care Unit (%)

The results of the baseline audit in the ICU (see Figure 2) identified that none of the criteria had high compliance with best practice (100%), four criteria (criteria 1, 2, 3 and 8) receive compliance rates ranging from 55% to 67%, and four criteria had compliance rates between 0% to 25% (criteria 4, 5, 6 and 7).

The results of the baseline audit for all teams aggregated (see Figure 3) identified that criterion 4



Criteria legend

1. Fall risk assessment is done upon admission. (94 of 94 samples taken)
2. Fall risk assessment is done upon transfer. (94 of 94 samples taken)
3. Reassessment occurs when there is a change in condition or following a fall. (94 of 94 samples taken)
4. Patients who have experienced a fall are considered at high risk for future falls. (94 of 94 samples taken)
5. Fall risk assessment is done accurately using a falls assessment tool. (94 of 94 samples taken)
6. Healthcare professionals have received education regarding falls assessment and prevention strategies. (86 of 86 samples taken)
7. Patient and family education is carried out for patients at risk of falls. (94 of 94 samples taken)
8. Targeted interventions are implemented according to risk factors. (94 of 94 samples taken)

Figure 3: Baseline compliance with best practice for audit criteria for all teams aggregated (%)

had a high compliance with best practice (100%), three criteria had compliance rates ranging from 54% to 64% (criteria 1, 2 and 8), and four criteria compliance rates from 0% to 39% (criteria 3, 5, 6 and 7).

In both units, the lack of nursing team knowledge and a standardized and validated tool were the main factors for poor compliance (see Figure 3). These factors affected decision-making about assessment upon transfer, reassessment due to changes in patient condition, implementation of targeted interventions according to risk factors, and education offered to patients and family. A further factor identified was that nursing staff had to be involved with both patients and management to create the conditions for reducing falls risk.

The initial audit identified a high level of compliance (100%) with the requirement to identify patients with pre-existing falls as patients at high risk of falls in the IMU (see Figure 3). This can be explained by the fact that this item was included in the preventive actions of the protocol for the prevention of falls, which was already in use by the nursing staff at the IMU. These patients were identified with visual alerts coded yellow (bracelet and risk of falling plate next to their beds), indicating the risk of falls in the HU-USP. However, in the ICU, the low level of compliance (0%) with the requirement to identify patients with pre-existing falls as patients at high risk of fall (see Figure 2) was a clear indication that the nursing team lacked knowledge about risk factors for falls.

The results of the initial audit was not surprising to the coordinators of the project and confirmed the assumption that team knowledge on the prevention of falls required updating and the hypothesis that low adherence to evidence-based criteria was due to lack of knowledge of the nursing staff. Strategies for identifying and overcoming the barriers were formulated as a follow-up to the implementation of best practice, as shown in Table 2.

Phase 2: Strategies for Getting Research into Practice (GRiP)

Table 2 shows the barriers to best practice falls prevention strategies that emerged from the project team discussions of the phase 1 results. It also shows resources identified as being required to implement the strategies and the outcomes.

Table 2: Getting Research into Practice matrix

Barrier	Strategy	Resources	Outcomes
Absence of established criteria for the assessment of the risk of falls at the time of hospital admission	• To include questions about the assessment of the risk of falls in the hospital admission questionnaire in the electronic documentation system of the nursing process • To build awareness about the system by highlighting the "risk of falls" diagnosis made by nursing staff in the nursing outcomes and nursing interventions related. • To educate nurses of the IMU and ICU on the use of the electronic documentation system of the nursing process with the new features available	• Computers with intranet access to the electronic documentation system of the nursing process • PowerPoint presentation • Training room with multimedia resources and computers with intranet access	• Electronic documentation system of the nursing process updated • 100% of the nursing staff of IMU and ICU trained
Absence of a standardization of criteria for the reassessment of the risk of falls in patients admitted	• To establish in the 'Falls Prevention Protocol' that patient risk of falls must be assessed by the nurse upon patient transfer to another unit if there are clinical changes or if patients suffer a fall. Patients with a medium or high risk of falls should be reassessed every 72 hours. • To educate nurses of the IMU and ICU on the 'Falls Prevention Protocol'	• PowerPoint presentation • Training room with multimedia resources and computers with intranet access	• 'Falls Prevention Protocol' updated and available to all nursing staff • 100% of the nursing staff of the IMU and ICU trained

Table 2. (*Continued*)

Barrier	Strategy	Resources	Outcomes
Absence of an standardized and validated instrument for assessment of the risk of falls	• To include the Morse Fall Scale in the 'Falls Prevention Protocol' and in the electronic documentation system of the nursing process • To educate nurses of the IMU and ICU on the use of the Morse Fall Scale	• Computers with intranet access to the electronic documentation system of the nursing process • PowerPoint presentation • Training room with multimedia resources and computers with intranet access	• Updated 'Falls Prevention Protocol' available to all nursing staff • Electronic documentation system of the nursing process with the Morse Fall Scale available for use by nursing staff • 100% of the nurses of the IMU and ICU trained
Lack of updated information on falls preventions aimed at the nursing staff	• To update the 'Falls Prevention Protocol', including the eight criteria, based on evidence • To make available the 'Falls Prevention Protocol' on the intranet, using a desktop icon for quick access • To educate nursing staff of the IMU and ICU concerning best practices on falls prevention	• Computers with intranet access at the IMU and ICU • PowerPoint presentation • Training room with multimedia resources	• 'Falls Prevention Protocol' updated and available to all nursing staff • 100% of the nursing staff of the IMU and ICU trained
Lack of information for the patient and family about the prevention of falls	• To produce a leaflet with information regarding falls prevention to be delivered to the patients and families • To educate nursing staff of the IMU and ICU on how to use this new educational resource to educate patients and families and to register on nursing notes into the patient's records	• Visual and graphic design tools used by the Communication team of the HU-USP • Printing equipment and materials to make leaflets for distribution among patients admitted to the IMU and ICU • PowerPoint presentation • Training room with multimedia resources	• Leaflet available to be delivered to patients and family • 100% of nursing staff of the IMU and ICU trained
Absence of updates to target interventions per individual patient risk factors	• To include the main nursing interventions, per patient levels of risk of falls and risk factors, in the 'Falls Prevention Protocol' • To include the intervention "Protocol for Falls" in the electronic documentation system of the nursing process with the main activities performed for patients at the IMU and ICU, according to risk factors and the risk of falls • To educate nurses of the IMU and ICU on the 'Falls Prevention Protocol'	• Computers with intranet access to the electronic documentation system of the nursing process • PowerPoint presentation • Training room with multimedia resources and computers with intranet access	• 'Falls Prevention Protocol' and electronic documentation system of the nursing process updated and available to the nursing staff • 100% of the nursing staff of IMU and ICU trained

IMU, Internal Medicine Unit; ICU, Intensive Care Unit; HU-USP, University Hospital of the University of São Paulo.

The project lead and key stakeholders established the following as key strategies for implementing the evidence into clinical practice: training of the nursing staff, as it was postulated that raising awareness of the relevance of this topic would promote the proper use of other criteria; use of a standardized and validated tool for assessing the risk of falls; choosing the most appropriate preventive interventions and activities according to the risk assessment and the evaluation of the relevant risk factors; and education of patients and families, by preparing a leaflet with accessible information on falls in order to serve as written support to be clarified by members of the nursing staff. There was also concern to optimize work, introducing the criteria into the institutional Falls Prevention Protocol and the electronic documentation system of the nursing process. Previous protocols, assessed by the nursing staff during the group dynamics session, such as visual identification of patients at risk of falls (use of color-coded wristbands and informative plates next to the bed), were retained in the current Protocol. The only adjustment made was the application to patients at intermediate and high risk of falls.

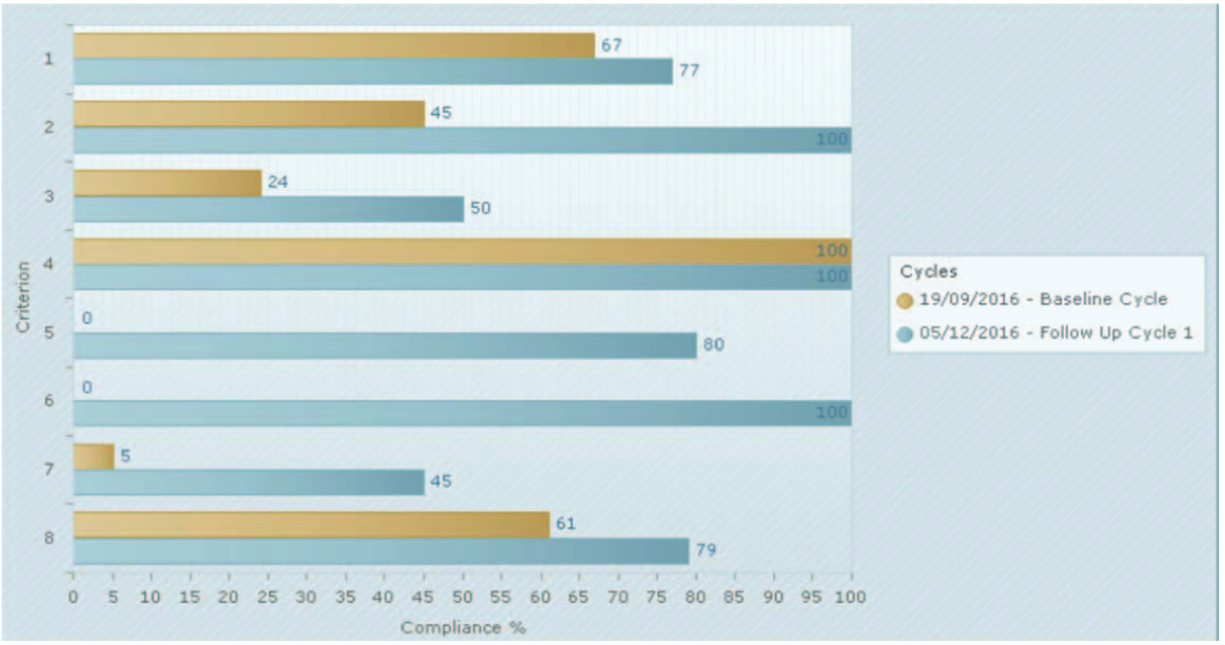
Phase 3: Follow-up audit

Data was collected by implementation team over one month (December/2016) in the IMU and 15 days (May 1–15 2017) in the ICU. The follow-up audit cycle results proved to be satisfactory as all best practice audit criteria showed an improvement as an aggregated result (see Figures 1, 2 and 3) in the IMU and ICU.

There was an increase in compliance rates for all best practices criteria. Specifically, there was 100% compliance with the criteria relating to the following: training of staff on the assessment and prevention of falls in the IMU and ICU (see Figures 4 and 5); identification of high risk patients presenting a former or current history of falls in the IMU and ICU (see Figures 4 and 5); and falls risk assessment during transfer to another unit in IMU (see Figure 4).

Also, the criteria showed 75% or more percentages of compliance with best practices in all teams aggregated: assessing the risk of falls on admission (75%), use of accurate instrument for the assessment of the risk of falls (77%), and implementation of targeted interventions according to the relevant risk factors (78%) (see Figure 6). These results suggest that the measures taken to implement the criteria in clinical practice were adequate and were able to overcome the barriers identified.

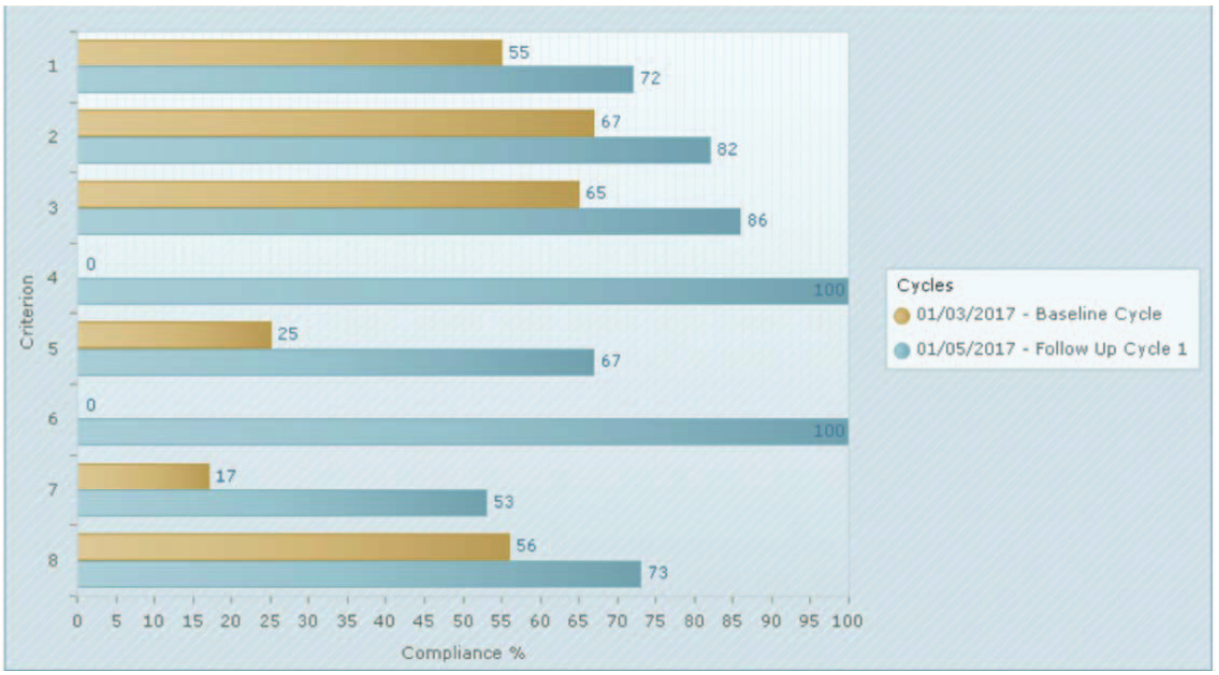
The assessment criterion of patients following a change in the medical condition or a fall showed a low compliance of the 50% in the IMU (see Figure 4). Most patients admitted to the IMU were clinically stable and those who become unstable or suffered significant clinical deterioration were transferred to the ICU, and this may have interfered with the reassessment of the risk of falls. Howerever, the same criterion in the ICU showed 86% of compliance with the best practices (see Figure 5),



Criteria legend

1. Fall risk assessment is done upon admission. (48 of 48 samples taken)
2. Fall risk assessment is done upon transfer. (48 of 48 samples taken)
3. Reassessment occurs when there is a change in condition or following a fall. (48 of 48 samples taken)
4. Patients who have experienced a fall are considered at high risk for future falls. (48 of 48 samples taken)
5. Fall risk assessment is done accurately using a falls assessment tool. (48 of 48 samples taken)
6. Healthcare professionals have received education regarding falls assessment and prevention strategies. (40 of 40 samples taken)
7. Patient and family education is carried out for patients at risk of falls. (48 of 48 samples taken)
8. Targeted interventions are implemented according to risk factors. (48 of 48 samples taken)

Figure 4: Baseline and follow-up audit results for the Internal Medicine Unit (%)



Criteria legend

1. Fall risk assessment is done upon admission. (18 of 18 samples taken)
2. Fall risk assessment is done upon transfer. (18 of 18 samples taken)
3. Reassessment occurs when there is a change in condition or following a fall. (18 of 18 samples taken)
4. Patients who have experienced a fall are considered at high risk for future falls. (18 of 18 samples taken)
5. Fall risk assessment is done accurately using a falls assessment tool. (18 of 18 samples taken)
6. Healthcare professionals have received education regarding falls assessment and prevention strategies. (46 of 46 samples taken)
7. Patient and family education is carried out for patients at risk of falls. (18 of 18 samples taken)
8. Targeted interventions are implemented according to risk factors. (18 of 18 samples taken)

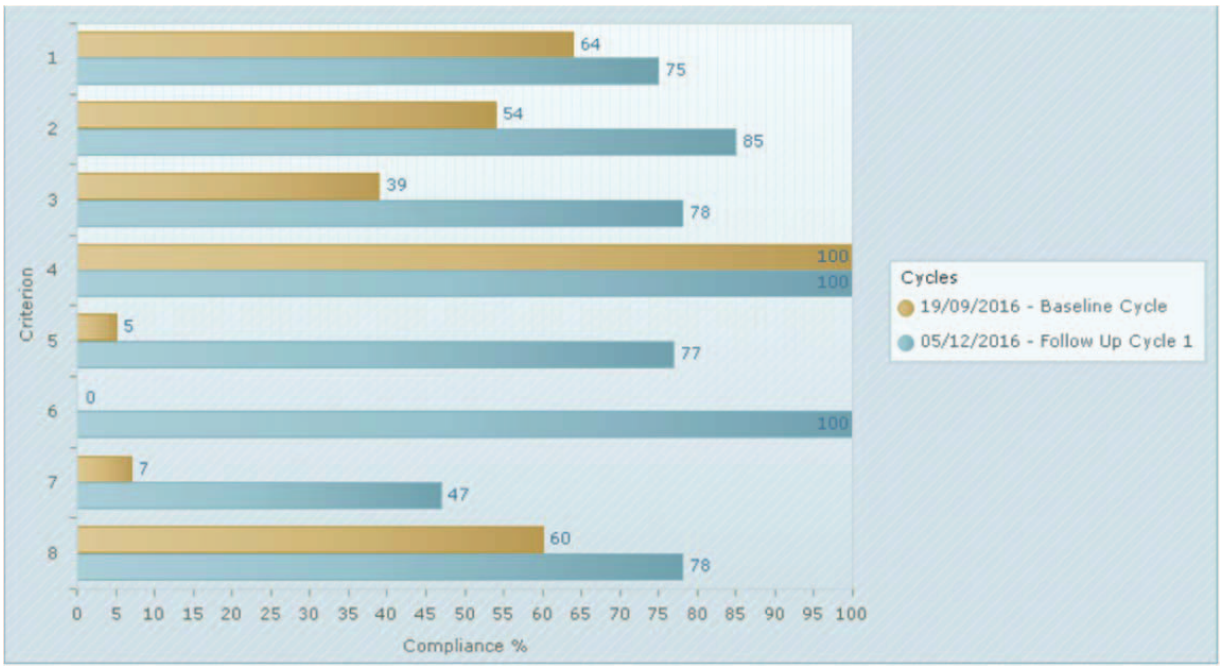
Figure 5: Baseline and follow-up audit results for the Intensive Care Unit (%)

because the patients were unstable and they needed frequent assessment. During the data collection period, patients who suffered falls went through a reassessment of the risk and were re-categorized as high risk.

The criterion that showed a low compliance in the IMU (45%) (see Figure 4) and ICU (53%) (see Figure 5) was the education of patients and their families on the prevention of falls. This criterion was considered valid if the oral and written information provided to the patients at risk of falls was registered in their chart, while just delivering the informative leaflet was not enough. It should be noted that the compliance with this criterion in the initial audit was only 5% and 17% in IMU (see Figure 1) and ICU (see Figure 2), respectively, showing a significant improvement, although such compliance is still less than adequate. For this criterion, it will be necessary to reinforce the available documentation with preventive guidelines or to establish that the patient or family member should sign a form when receiving the leaflet.

It should be noted that the criteria ON the use of a standardized instrument to assess the risk of falls (in IMU), identification of high risk patients presenting with a former or current history of falls (in ICU) and the training of staff on risk assessment and prevention of falls presented a 0% compliance at the initial audit and a compliance over 80% at follow-up (see Figure 4).

The rate of falls at the IMU between November/December 2016 and January/February 2017 was measured using the formula: number of falls/number of patients/day x 1000, as presented in Figure 7.



Criteria legend

1. Fall risk assessment is done upon admission. (66 of 66 samples taken)
2. Fall risk assessment is done upon transfer. (66 of 66 samples taken)
3. Reassessment occurs when there is a change in condition or following a fall. (66 of 66 samples taken)
4. Patients who have experienced a fall are considered at high risk for future falls. (66 of 66 samples taken)
5. Fall risk assessment is done accurately using a falls assessment tool. (66 of 66 samples taken)
6. Healthcare professionals have received education regarding falls assessment and prevention strategies. (86 of 86 samples taken)
7. Patient and family education is carried out for patients at risk of falls. (66 of 66 samples taken)
8. Targeted interventions are implemented according to risk factors. (66 of 66 samples taken)

Figure 6: Aggregated baseline and follow-up audit results (combined Internal Medicine Unit and Intensive Care Unit) (%)

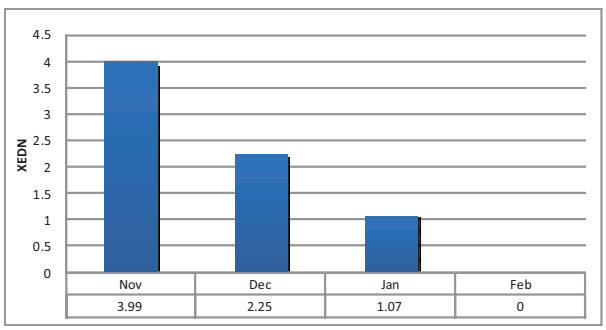


Figure 7: Rate of falls (number of patient falls/ number of patient days X 1000) in the Internal Medicine Unit from November/December 2016 to January/February 2017

Discussion

The main objective of this project for the implementation of evidence into clinical practice was to prevent falls in adults and elderly people admitted to the IMU and ICU through best practice. The initial audit evaluated eight criteria to assess the compliance of current practices to to the best evidence available in the literature. The key finding was that for most criteria, a low level of compliance was observed.

The project coordinators decided to undertake group dynamics involving nursing staff and stakeholders to identify barriers to compliance and determine strategies in order to change current practices. The barriers and strategies were identified by the nurses and nursing technicians. It was believed that nursing staff could contribute effectively to the

identification of the main problems faced in daily practices and with realistic suggestions to address them. Structured meetings were organized to encourage critical-reflexive thinking and an attitudinal change among the nursing staff. Nursing staff played an active role in the transformation of clinical practice. The information obtained in the course of the group dynamics was used by the project team to build the GRiP model and develop strategies to overcome the barriers identified.

The main actions undertaken by the coordinating group were a training program for the nursing staff, the inclusion of a standardized instrument for the assessment of falls, and educational activities on the prevention of falls for patients and their families. Classroom-based lessons of approximately 40 minutes were introduced to train the nursing staff. These lessons covered the following: information on the prevention of falls, including general and specific data of the IMU and ICU; the best available evidence in the literature; and the results of the group dynamics involving the nursing staff to show the proposals identified by the team. The lectures were delivered over a longer period of time than anticipated by the coordinating team, because they were scheduled during working hours, therefore the groups were small and it was necessary to schedule repeated sessions in order to include the greatest possible number of nurses and nursing technicians.

The Falls Prevention Protocol was updated by the coordinators of the project to include the best evidence-based practice and standards were established to promote documentation of the nursing process during assessment, diagnosis and outcomes, and during nursing interventions. Targeted interventions related to key risk factors and levels of risk for falls were selected and included. The Patient's Safety Group approved the content of the Falls Prevention Protocol and the Teaching and Quality Service made the content available on the Intranet, so that access was possible from all the computers at the IMU and ICU.

The introduction of a standardized tool for the assessment of the risk of falls was also a priority in this study. The Morse Fall Scale was selected based on the availability of a translated version in Portuguese, its cross-cultural adaptation to Brazil,[33] and because it is recommended by the NPSP.[2]

For educating patients and families, a leaflet was created with specific content on the prevention of falls, based on best practice and key issues related to the falls of patients at the IMU and ICU. The challenge in creating this leaflet was to make the content available to service users with a low educational level. Adjustments were made with the help of the Teaching and Quality Service and the Communication Center of the HU-USP, which developed a visual design suitable to meet user needs. This material was developed over one month and forms were made available to patients at the same time as the nursing staff was undergoing the training process.

The last item suggested by the nursing staff was the inclusion of the Protocol updates and the Morse Fall Scale in the electronic documentation system of the nursing process in order to optimize the work of nurses and ensure that records were compliant with current recommendations. This task proved particularly challenging, as the computer system is complex and access to it is limited to a few professionals. The structure of the program is based on links between diagnoses, outcomes and nursing interventions, and it was important to maintain these links during the process of introduction of the new items. A nursing professional of the Teaching and Quality Service, an expert in computer science, and a project coordinator collaborated over one month to plan the revised structure of the program, update the information, and perform operating tests.

The results of the follow-up audit showed that the strategies used were designed to overcome the barriers identified, and compliance with the majority of best practice criteria ranged from moderate to high. The only criterion with a low compliance level was related to the education of patients and their families, although it did increase substantially from the initial audit to the follow-up (from 5% to 45% in the IMU (see Figure 4); from 17% to 53% in ICU (see Figure 5)). A review of this criterion should be considered to identify the relevant barrier in daily practice and reexamine strategies to overcome it.As part of the routine practice at the IMU and ICU, the leaflet was kept in an easily accessible location to be handed out to patients during their admission and that this was recorded on the patient's chart. As the leaflets were distributed to patients, the head nurse would ensure that more copies were available. It was observed, at the follow-up audit, that the nursing records did not include this content, although the leaflets had been delivered, indicating that the patients and their families received the leaflet.

However, leaflets given to patients might not mean that they had received the information; it was necessary to make the nurses aware about the importance of actively educating the patients and their relatives and the correspondent documentation in the patient health records.

The rate of falls at the IMU, during the period following the implementation of the best evidence practice, gradually decreased until no falls were recorded in the month of February (see Figure 7). Patients who fell during this period suffered no further harm. These results are preliminary and may be affected by the recent changes introduced by the project. It is important to reassess this trend over the following months to determine whether this pattern is sustainable.

Falls in hospitals are adverse events that cause significant harm to the patient, family and health services. Coordinated strategies have been developed worldwide to minimize the occurrence of falls and reduce their impact. In Brazil, the National Patient Safety Program recommends the inclusion of specific measures, such as risk assessment and the education of patients, families and professionals in order to reduce the occurrence of falls.[1-4]

The findings of this project have shown that the use of audits and the identification of barriers and strategies for implementation of best practice evidence effectively reduced the number of falls. Educational strategies on the prevention of falls, including a standardized instrument for the assessment of falls and the adaptation of essential resources in the work process of nurses and nursing technicians, were effective in promoting a high compliance to criteria related to best practice.

Conclusion

The aims of the project were to determine current compliance with evidence-based criteria regarding falls prevention, to improve knowledge regarding best practice and compliance with evidence-based criteria about falls prevention, and to improve outcomes related to falls prevention among adults and older adults in IMU and ICU. In conclusion, all the goals were achieved by using critical reflection and attitudinal mobilization strategies to promote active participation of the nursing staff in the process of identifying barriers and solutions.

This project demonstrated that the availability of educational materials, the use of facilitating tools in the work environment, and support from the institution and groups specializing in education and patient safety, contributed to the implementation of evidence into clinical practice. The rate of falls declined in the months following the implementation of strategies (from 3.99 in November to zero in February) as a result of this project and those patients who had falls did not suffer any further harm. This finding directly reflects the standards of nursing care and has an impact on institutional indicators and costs and more importantly, on the good quality of care the patients are receiving in a safe environment.

Currently, the Falls Prevention Protocol is being implemented in the adult patient wards of the hospital, and the nursing team is being trained to apply the protocol. The project was successful in increasing knowledge in this area and providing future directions for sustaining evidence-based practice change. Future plans and ideas are in place and have been discussed. Further audits will need to be carried out in order to maintain the practice change and ensure the project is supported and maintained.

Acknowledgements

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Appendix I: Audit tool

Criteria	Yes	No	N/A
1. Fall risk assessment is done upon admission			
2. Fall risk assessment is done upon transfer			
3. Reassessment occurs when there is a change in condition or following a fall			
4. Patients who have experienced a fall are considered at high risk for future falls			
5. Fall risk assessment is done accurately using a falls assessment tool: a. Morse Fall Scale completed daily			
6. Healthcare professionals have received education regarding falls assessment and prevention strategies a. Nursing staff report that they have received education in the last year			
7. Patient and family education is carried out for patients at risk of falls a. Information should be offered both orally and in writing			
8. Targeted interventions are implemented according to risk factors			

