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Assessing the Time of Completion and Patients' Perception of Their Mobility to Accurately Score Fall Risk Assessments

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Abstract

This study aimed to examine the time to complete fall risk assessment tools, Hendrich II Fall Risk Assessment Model (Hendrich II) and Patient Mobility Assessment Tool (PMAT) in a San Francisco Bay Area hospital. In addition, this study examined the efficacy of patients' perceptions of their own mobility, when asked as part of the fall risk assessment process. Data was collected and analyzed on seventy-four patients across four nursing units, Medical, Surgical, Telemetry, Medical-Surgical/Oncology. The data indicated that, on average, Hendrich II took 00:01:49 minutes and PMAT took 00:04:12 minutes when completed separately. When asked about their own mobility level, 66 out of 74 patients, or 89.12 percent, could accurately predict their mobility and assistance level. In conclusion, fall risk assessment tools do not require much time to complete, especially when combined with nursing assessments already in place. Moreover, patients are reliable sources of their mobility and assistance level and, when time is limited, patients' perceptions can be substituted for the actual performance test of the assessment tools. Ideally, patient and nurse communication and collaboration is used to complete the fall risk assessment to maintain patient and provider safety.

Introduction

Patient falls in an inpatient, outpatient, or community care setting are a major issue among the American health care system. A patient fall is an unplanned descent to the floor with or without injury to the patient that occurs on a nursing unit that is eligible to report the given fall (Anderson et al., 2009). According to the Agency for Healthcare Review and Quality (AHRQ), about 700,000 to 1 million patient falls occur annually. Moreover, AHRQ estimates that nearly one-third of patient falls are preventable with improved care coordination (Ganz D.A., Huang C., Saliba D., et al. 2013). When considering that unintended patient falls while under nursing care are mostly all predictable and preventable, it is no surprise that reducing the number of falls is a major focus of nearly all health care facilities.

A patient fall may occur at any time during an acute hospital stay, at a long-term care facility, or during an outpatient procedure or test (National Center for Injury Prevention and Control, 2007). However, research by the National Center for Injury Prevention and Control (2007) estimates that at least 50 to 75% of falls occur in the patient's room while the patient is unattended and attempting to get up and go to the bathroom to meet elimination needs.

Falls result in a number of adverse events for patients. Namely, falls can cause an increased patient fear of falling, a loss of functional abilities for activities of daily living, and an increased length of hospital stay (Verheyden et al., 2013). While an unintended fall can affect anyone, older adults are considered one of the highest fall risk groups. Conservative estimates indicate that, among those that fall, 20 to 30% suffer moderate to severe injuries (Kramarow et al., 2015). Consequences from falls, though, can be far more fatal for older and elderly adults. Among older adults, falls are the leading cause of injury deaths (National Center for Injury Prevention and Control, 2007). Additionally, adults over the age of 75 have a mortality rate eight times higher than those 65 to 74 years old (Kramarow et al., 2015).

In addition to the negative physical and psychological impact of falls on patients, patient falls also present a financial consequence to health care facilities across the United States. A patient fall with injury is estimated to cost a hospital between 14,000 and 30,000 dollars (Landro, 2005). In 2015 alone, Medicare spent approximately 50 billion dollars on medical care related to an unintended patient fall (Florence et al., 2018; Haines et al., 2013; Wong et al., 2011). Negative financial effects of patient falls have led to legislative changes that impact hospital reimbursement.

In response to a 2005 report distributed by the Institute of Medicine citing several high-volume and high-cost hospital-acquired conditions, including patient falls after admission, the Center for Medicaid and Medicare Services (CMS) altered the reimbursement payments to hospitals. Beginning in October 2008, CMS no longer reimbursed hospitals for medical care required after a patient fall in the hospital (Inouye, Brown, & Tinetti, 2009). This change in CMS reimbursement was intended to financially incentivize hospitals to implement evidence-based assessments and interventions to reduce unintended patient falls in the inpatient setting.

In addition to patients and hospitals, unintended falls have negative consequences for the safety and health of nursing staff. Patient falls increase the risk of non-fatal injuries of nursing staff in the workplace. According to the Bureau of Labor Statistics, registered nurses and other nursing personnel are consistently one of the highest occupational risks for sustaining musculoskeletal and back injuries in the workplace. Moreover, musculoskeletal injuries for registered nurses resulted in 55.7 lost work days per 10,000 days, compounding the financial burden of patient falls to hospitals and nursing staff (Bureau of Labor Statistics, 2014).

To improve safe patient movement and reduce the incidence of patient falls and nursing staff related injuries, nursing education about safe patient handling and mobility (SPHM) has increased in recent years. Eight national standards guide employers, hospitals, and nursing staff in the safe handling of patients to protect the safety of nurses. These standards include (1)

Establishing a culture of safety; (2) Creating a sustainable program; (3) Incorporating ergonomic design principles; (4) Developing a technology plan; (5) Educating and training health care workers; (6) Assessing patients to plan care for their individual needs; (7) Setting reasonable accommodations for employees return to work post-injury; (8) Implementing a comprehensive evaluation system (American Nurses Association, 2013). The goal of SPHM education is to teach safe maneuvering techniques and lift assist equipment for transferring and mobilizing patients (Gallagher, 2013). Ultimately, SPHM intends to improve patient and provider safety by reducing unintended patient falls.

To improve the safety of patients and staff, there are numerous fall risk assessment tools that have been implemented across a variety of health care settings. The purpose of fall risk assessment tools is to predict patients that are at risk of falling and enact appropriate fall prevention interventions and monitoring to reduce the likelihood of an unintended fall. Research and studies have classified different fall risk assessment tools to be appropriate in various settings. For example, while a fall risk assessment tool may be applicable in the inpatient setting, another may be more suited for a community or long-term care setting. Similarly, the utility of a given fall risk assessment tool may be heavily dependent on the admitting diagnoses of a given patient population. While one tool may work especially well for cognitively impaired patients, for example, another may be more useful for orthopedic patients. Moving forward, this review focuses on the Hendrich II Fall Risk Model (Hendrich II) and the Patient Mobility Assessment Tool (PMAT) because these specific fall risk assessment tools are the tools utilized by the inpatient hospital that is the subject of the project objectives.

Hendrich II Fall Risk Model (Hendrich II) is a fall risk assessment tool exclusively designed to accurately predict patients in the acute inpatient setting that are at high risk for falling. Hendrich II evaluates a patient's risk for falling based on seven independent risk

factors: (1) Confusion, Disorientation, Impulsivity; (2) Depression; (3) Altered Elimination; (4) Dizziness, Vertigo; (5) Gender (Male); (6) Administration of Benzodiazepines and Antiepileptics; and (7) Gait and Mobility Test. Each risk factor is assigned a specific score. The patient either has the risk factor or doesn't; when present, the patient is given the number of points for that item. If a factor isn't present, the patient receives a score of zero for that factor (Hendrich, 2007). A cumulative score of five or higher indicates the patient is a "high fall risk." Based on several studies, results of sensitivity and specificity are mixed. A systematic review by Park (2017) indicated high sensitivity and low specificity, 76% and 60% respectively, of Hendrich II. Another study indicated similar findings with a sensitivity of 70% and specificity of 61.5% (Callis, 2016). Contrarily, a separate study found the inverse to be true, with a low sensitivity of 55% and a high specificity of 90% (Nassar & Madi, 2014). Nevertheless, a literature review by Rivera (2017) indicated that Hendrich II is a suitable fall risk assessment tool for the inpatient acute care setting.

The Patient Mobility Assessment Tool (PMAT) was developed from the Banner Mobility Assessment Tool with a goal of correctly identify patients' mobility level and appropriate assistive equipment necessary to lift, transfer, or mobilize (Boynton et al., 2014). PMAT is an assessment tool that follows a step-by-step method to determine patients' mobility levels at the bedside. The five step functional tasks include (1) Sit and Shake; (2) Stretch and Point; (3) Stand; (4) March and Step; and (5) Walk. If a patient does not pass the criteria for a given step and progress to the next step of the assessment, an algorithm is followed to determine the appropriate mobility equipment to use for that patient. The goal of PMAT is to maximize patient mobility while maintaining the safety of the patient and the nursing staff.

Objectives

In conjunction with the Falls Committee at a San Francisco Bay Area nonprofit community hospital and the University of San Francisco Cohort 22 Clinical Nurse Leader

students, the objective of this project was to operationalize the implementation and utilization of the Hendrich II and PMAT assessments in the inpatient setting. To operationalize Hendrich II and PMAT, two main components were addressed. First, the average time to complete each assessment tool by a registered nurse was determined. The timing of each assessment was necessary to establish the practicality of implementing Hendrich II and PMAT as a required nursing assessment. Second, the validity of patients' own perceptions of their mobility in comparison to their mobility level assigned by the assessment tool was determined. Determining the validity of patients' own perceptions may allow nurses to complete, or replace, partial aspects of the assessments in a time restrictive environment if necessary.

Methods

Overall, seventy-four patients were assessed using Hendrich II and PMAT across four separate units (Medical, Surgical, Telemetry, Medical-Surgical/Oncology) of a nonprofit community hospital in the San Francisco Bay Area. Data collection occurred across five days in March and April 2018 and began at 8 o'clock in the morning and concluded at 3 o'clock in the afternoon.

A standardized data collection form, created by one team member, was used for data collection for each of the seventy-four patients (Appendix A). The form was used to collect data about the number and type of equipment each patient was connected to, the patient's prediction of his or her ability to rise from a seated to a standing position, the time to complete each step of Hendrich II and PMAT, and the student scoring of Hendrich II and PMAT based on the patient's ability.

Each member of the team was assigned to a specific role: primary assessor, secondary safety assessor, recorder, and documenter. First, permission was obtained from the charge nurse on the unit for the team to assess patients on the floor. Next, permission was obtained from the primary nurse of each patient to ensure the patients were eligible to be moved and

assessed. Any patient that was not eligible based on the conversation between the team and the primary nurse was excluded from the study. Permission was obtained from each patient via verbal consent by one member of the team prior to the entire assessment team entering the room. Patients that refused to participate were excluded from the study. While verbal consent was being obtained from the patient, remaining group members reviewed the patient diagnosis and any precautionary measures that needed to be taken to maintain patient and provider safety.

Once the entire team entered the patient's room and introduced themselves, the primary assessor would ask the patient how many attempts the patient thought it would take to rise from a seated to a standing position. The primary assessor would also ask if the patient typically used any assistive devices, such as a cane, walker, or wheel chair. All responses were recorded on the data collection sheet by the recorder. The primary and secondary safety assessor completed each step of the Hendrich II and PMAT assessments while the recorder measured the time taken to complete each step on the data collection sheet. The secondary safety assessor made sure proper safety precautions were taken, such as the use of a gait belt and a safety chair placed behind the patient when walking. After the completion of the Hendrich II and PMAT assessments, the patient was safety returned to bed, or chair, and thanked for their participation in the study. The recorder transferred the data sheet to the documenter, who was sitting outside the patient room at a computer work station. The documenter completed the data collection sheet with patient demographic information and the primary nurse's Hendrich II and PMAT score found in the electronic health record system. After each of the five assessment days, data from each patient data collection sheet was transferred into a large database for further analysis.

Results

The average time to complete the Hendrich II assessment was calculated to be 0:01:49 minutes. Moreover, when excluding the introduction time between the team and the patient, Hendrich II was found to take about 00:01:10 minutes (Figure 1). The average time to complete

the PMAT assessment was calculated to be 00:04:12 minutes. After removing introduction time, PMAT assessment was found to take 00:03:45 minutes (Figure 2). Not surprisingly, when patients who were assessed at a level 5 (can walk independently) were eliminated, the time to complete the PMAT assessment decreased to 0:02:14. This is because, per the PMAT algorithm, patients at a level 1 through 4 should not walk as a step in the test, decreasing the time to complete the assessment.

Average Hendrich II Assessment Time		
Unit	**Avg Time Hendrich II Alone**	**Avg Time Hendrich II Plus Introductions**
Surgical	0:01:15	0:02:07
Medical-Surgical/Oncology	0:00:45	0:00:53
Telemetry	0:02:03	0:02:14
Medical	0:00:27	0:00:46
OVERALL	**0:01:10**	**0:01:49**

Figure 1. Average Hendrich II Assessment Time.

Average PMAT Assessment Time				
Unit	**Avg Time PMAT Alone**	**Avg Time PMAT Level 1-4, No introductions (62% of patients)**	**Number of Level 5 Patients**	**Avg Time PMAT Plus Introductions**
Surgical	0:03:15	0:02:17	19/48 = 40%	0:04:07
Medical-Surgical/Oncology	0:02:32	0:01:48	1/2 = 50%	0:02:40
Telemetry	0:05:35	0:02:41	2/8 = 25%	0:05:46
Medical	0:02:10	0:00:47	6/15 = 40%	0:02:29
OVERALL	**0:03:45**	**0:02:14**	**28/74 = 38%**	**0:04:12**

Figure 2. Average PMAT Assessment Time.

Significant correlation was found between the number of devices a patient is connected to and the time it takes to complete the assessment. The more devices a patient is connected to, the longer Hendrich II and PMAT assessments took, on average. Hendrich II assessment, for example, was completed in 0:00:27 seconds on the Medical unit where patients were attached to 0.33 devices, on average. Contrarily, Hendrich II took an average of 0:02:03 minutes on the Telemetry unit where patients were connected to 2.33 devices (Figure 3).

Devices Attached to Patients				
Unit	**Avg # of Devices**	**Devices in Use**	**Times to Complete Hendrich II**	**Number of Patients**
Surgical	1.02	IV, urinary catheter, SCDs, O2, colostomy, NG tube	0:01:15	48
Medical-Surgical/Oncology	1	IV, O2	0:00:45	2
Telemetry	2.33	IV, portal telemetry, urinary catheter, SCDs, O2, NG tube	0:02:03	9
Medical	0.33	IV, urinary catheter, O2	0:00:27	15
OVERALL	**1.04**			**74**

Figure 3. Devices Attached to Patients.

Results indicate that patients can accurately self-appraise their mobility level when asked how many attempts they will take to rise from a seated to a standing position. Of the seventy-four patients assessed, sixty-six patients, or 89.19 percent, could correctly predict their mobility level. Of the eight patients that incorrectly predicted their mobility level, only two patients overestimated their mobility level while the others underestimated their mobility level or did not make a mobility prediction prior to beginning the PMAT assessment (Figure 4).

Patient Predictions			
Unit	**Correct**	**Incorrect**	**Percentage Correct**
Surgical	45	3	93.75%
Medical-Surgical/Oncology	0	2	0%
Telemetry	8	1	88.89%
Medical	13	2	86.67%
TOTAL	**66**	**8**	**89.19%**

Figure 4. Patient Predictions.

Implementation

A number of deliverables were generated as a result of the data collected with this project. First, a nurse education module was created to educate nurses about the scoring system of Hendrich II. The module clearly defines each risk factor component of Hendrich II, the rationale for the risk factor's inclusion in the Hendrich II assessment, and how the risk factor should be scored. The objective of the nurse education module is to standardize the Hendrich II assessment for nurses and accurately score patients' risk for falls.

Additionally, patient scenario videos were created as a means of demonstrating an accurate nursing assessment of a high-risk fall patient using Hendrich II. The video scenarios demonstrate how to safely and correctly perform the assessment and show how quickly the Hendrich II assessment can be performed with a typical nursing assessment in the inpatient setting. Follow up videos and discussions demonstrate the accurate scoring of each patient's fall risk to the video viewer. Scenario number one showcases an impulsive patient who is presenting with dizziness and is unable to safely rise on his own without assistance. Scenario number two showcases a patient with unstable balance who is dizzy and confused. Both scenarios were drawn from real-life patients to show actual experiences of the team during the data collection process. A final video displays a nurse-patient partnership. Establishing a

partnership between patients and nurses can facilitate effective communication in the hospital and promote patient safety by indicating how and when to seek assistance when toileting or getting up and moving safely around the room.

Discussion

As a newly implemented fall risk assessment at the hospital at center of this study, timing of the assessment is particularly important when considering compliance by the nursing staff. Nurses are inundated with innumerable tasks to complete in a finite amount of time. As such, any additional task must be value-added in order to achieve compliance with the assessment. The study concluded that a typical Hendrich II and PMAT assessment, when combined with routine nursing assessments already in place, should take about three minutes of nursing time. When considering that most hospitalized patients in the study, nearly two-thirds, scored a PMAT level 4 or below and therefore don't require walking around the room or unit as part of the assessment, the time is even shorter. By incorporating Hendrich II and PMAT assessment into the nursing assessment already in place, the added time of assessing fall risk is not significant. In fact, assessing fall risk and understanding patients' mobility from the beginning of the shift can actually help nurses understand the kind of assistance patients require and can aid in predicting the time needed for bathroom assistance, for example, later in the shift. Electronic charting of Hendrich II and PMAT assessments can, in addition, communicate to other staff, such as nursing assistants, physical therapy, and occupational therapy, the level of care and time likely needed when working with a particular patient.

In addition to the importance of the time required to complete Hendrich II and PMAT, understanding patients that may require additional time when completing the assessment is also important. It is not surprising that a direct correlation exists, based on the data of this study, between the number of medical devices attached to a patient and the time it takes to

complete an assessment. Medical devices require detaching, moving, and adjusting when performing assessments so it is important to take this into account when planning to assess a patient attached to a number of devices. Based on the data collected, it took about two minutes to complete the fall risk assessment for patients on a unit where patients were connected to an average of 2.33 medical devices. Contrarily, it took just over one minute to the complete the same assessment for patients on a separate unit where they were connected to an average of 1.02 medical devices. The data reveals that nurses should predict the time spent on fall risk assessment to be greater if patients are connected to multiple devices. The prediction can aid in arranging patient assessments and care, especially in situations where prioritizing patients is necessary.

An important part of this study was trying to understand if patients are reliable historians when it comes to their health care. Specifically, the study attempted to assess how patients' perceptions of their own mobility aligned, or did not align, with patients' mobility and fall risk scores as assessed with the Hendrich II and PMAT assessment tools. In theory, if patients' self-appraisal of their own mobility is reliable, the portion of the assessment tool that requires patients to actually get up and move around the room, the "Get Up and Go" test, could be substituted with patients' perceptions and would yield the same score. According to our data, patients were correct in their judgements of their own mobility 89 percent of the time. When examining the data more closely, of the 11 percent whose perceptions were incorrect, three did not give an answer when asked of their mobility level and an additional three underestimated their abilities. Only two patients, or 2.7 percent, incorrectly overestimated their abilities. This is telling information when thinking about how to incorporate and engage patients' in their care. Based on the data collected in this study, patients are excellent historians of their mobility and, thus, can be appropriately collaborated with when assessing patient mobility and fall risk. If pressed for time, nurses could, although

it is not ideal, rely on patients' impressions relayed in a conversation in lieu of taking the time to perform the "Get Up and Go" portion of the assessment. However, it is much more appropriate to gauge patients' impression of their abilities and use it as a means to partner with them in assessing and preventing a fall in the inpatient setting. By collaborating with patients, nurses are able to utilize patient-centered care and patients feel more involved in the care they receive, leading to better outcomes and improved quality of care.

It is important to note that a number of limitations exist within this study. First, patients were not selected at random. In fact, to improve the sample size and see the greatest number of patients possible, patients that were soon to be discharged were seen first. Because patients were seen on their day of discharge, this may have led to a sample size that was more mobile than the average inpatient population. In addition, another limitation is the sample size. While seventy-four patients across four units were included in the study sample, the sample did not include equal numbers from each unit and some units were not included in the study at all. To validate the findings of the study, additional units should be included with an equal number of patients, selected at random, included in the study.

Future Directions

In subsequent cohorts of Clinical Nurse Leader students, a number of changes could be made to this project to validate the current findings and further the scope of the of the fall risk assessment tools for the sake of patient and nursing staff safety.

First, data collection should be expanded to cover more hospital units and patient populations to validate the findings of the current study. This study included seventy-four patients across four different units in the hospital, however, the patients studied came primarily from the Surgical unit. Forty-eight patients, or about 69 percent of the patients studied were of the Surgical patient population. It would be interesting to see if the current findings are validated after expansion to other units where the patient population may be at a higher risk for

falls. Critical care patients and dementia patients would be particularly interesting because these patients are often confused and disoriented, criteria for the Hendrich II assessment that is heavily weighted. High fall risk units need, arguably, standardized assessment the most, so it would be telling to see how the implementation of standardized fall risk assessment tools on these units would impact the number of falls among these populations.

Finally, much improvement can be made to the standardization of the fall risk assessment tools by standardizing the definitions of each risk factor criteria within the assessment. For example, without a standard definition of "altered elimination," one nurse may consider a urinary catheter altered elimination while another may not use the same criteria. This project aimed to address the differences in definitions that likely exists on a nurse by nurse basis by creating the nursing education module. The goal of the education module is to explicitly state the definition and criteria for each risk factor in the Hendrich II assessment. Further work in future projects could expand this standardization by working with the technology department of the hospital to list risk factor criteria in the electronic health record. While making changes to the electronic health record is a lengthy and expensive process, collaboration with the technology department to list the precise criteria for each risk factor on the sidebar of the electronic health record could allow for significant improvements to the standardization of fall risk assessment from nurse to nurse and unit to unit. The investment would be worthwhile.

While improvements have been made to the implementation and standardization of fall risk assessment tools, specifically Hendrich II and PMAT, the work to improve patient and provider safety in the hospital setting is never over.

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Appendices

Appendix A. Data Collection Sheet

Room Number: _____ Patient Name: _____

Equipment In - Use		
TYPE	**YES**	**NO**
IV		
Portal Telemetry		
Urinary Catheter		
Rectal Tube		
O_2 Tank		

Fall Assessment Time Table	
TASK	**TIME**
Group Entered Room	
Test Started	
When Patient Got to Edge of Bed	
Test Ended	
When Patient Got Back in Bed	

Hendrich II Fall Risk Model			
RISK FACTOR	**RISK POINTS**	**STUDENT SCORE**	**RN SCORE**
Confusion/Disorientation/ Impulsivity	4		
Symptomatic Depression	2		
Altered Elimination	1		
Dizziness/Vertigo	1		
Gender (Male)	1		
Any Administered Antiepileptics (anticonvulsants): (Carbamazepine, Dialproex Sodium, Ethotoin, Ethosuximide, Felbamate, Fosphenytoin, Gabapentin, Lamotrigine, Mephenytoin, Methsuximide, Phenobarbital, Primidone, Topiramate, Trimethadione, Valproic Acid)	2		
Any Administered Benzodiazepines: (Alprazolam, Chloridiazepoxide, Clonazepam, Clorazepate Dipotassium, Diazepam, Flurazepam, Halazepam, Lorazepam, Midazolam, Oxazepam, Temazepam, Triazolam)	1		
Get-Up-and-Go Test: "Rising from a Chair" If unable to assess, monitor for change in activity level, assess other risk factors, document both on patient chart with date and time			
Ability to rise in single movement – No loss of balance with steps	0		
Pushes up, successful in one attempt	1		
Multiple attempts but successful	3		
Unable to rise without assistance during test If unable to assess, document both on patient chart with date and time.	4		
(A score of 5 or greater = High Risk)	**TOTAL SCORE**		

Appendix B. Incorrect Patient Predictions

Diagnosis	Age	Patient Prediction	Prediction Correct	Hendrich II Score	PMAT Score
Abscess (Sigmoid Colon)	80	Unsure	No	4	4
GI Bleed	86	1st try, no assist	No	9	3
Right Hip Arthritis	81	2 tries	No	2	4
PNA, Multiple Myeloma	87	2nd try, no assist	No	2	5
Skull Base Chordoma, CHF, PNA	47	1st try, no assist	No	4	N/A
PNA	89	Not able to predict	N/A	3	4
Drug OD	53	Multiple tries	No	3	4
Hypoglycemia Dementia	84	Unknown	N/A	4	N/A