Data to Knowledge Analysis of Fall Root Causes and Contributing Factors

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Falls are a public health conundrum. According to the Centers For Disease Control and Prevention (2013), on a yearly basis, one third of adults 65 years of age and older fall. Falls are the leading cause of injury and death among this age group due to head trauma and fracture injuries. These injuries cause significant disability and decreased quality of life for individuals. Falls in patients 65 and older in healthcare institutions significantly contribute to morbidity and mortality, and challenge institutions to examine fall prevention programs and methods.

Fall risk increases with hospitalization by virtue of an illness, an unfamiliar environment, treatments, and medications. Falls are a serious safety issues in hospitals and falls with injury continue to remain the top adverse event (Boushon et al., 2012). Both are devastating to patients, clinicians, and healthcare organizations. Injurious falls are associated with extended hospital length of stay and increased hospital cost. Falls with injury are one of the National Quality Forum’s serious reportable events (National Quality Forum, 2007). In 2008, The Centers for Medicare and Medicaid services named falls with injury as a hospital acquired condition (HAC) “never event” (Centers For Medicare And Medicaid, 2008). Hospitals receive no additional payment for cases in which the selected HAC was not present on admission. No reimbursement is paid for the costs incurred to treat any injury resulting from a fall. Roughly 3 to 20% of patients fall at least once during a hospital admission with injury prevalence ranging from 30-51% (Oliver, Healey, & Haines, 2010). Injuries from in hospital falls include fractures, subdural hematomas, and excessive bleeding that may lead to death. It is reported that a fall without serious injury costs an organization additional $3500 while falls with injury can cost an additional $27,000 (Boushon et al., 2012).
Prevention of falls continues to challenge healthcare institutions. Most falls are preventable. The most common approach to reduction of falls is implementation of multifactorial interventions (Cameron et al., 2012). Universal approaches to preventing falls in acute care settings have proved to be inadequate. The most effective prevention program includes individualized targeted multiple intervention strategies in addition to universal precautions (Ang, Mordiffi, & Wong, 2011). A cadre of organizations identified the use of post fall huddle or debriefing as a best practice intervention to review and evaluate a fall incident (Boushon et al., 2012; Degelau et al., 2012; Ganz et al., 2013; Hempel et al., 2013). Post fall huddles are essentially a root cause analysis (RCA) of the event. RCA is used in healthcare to evaluate medical errors or undesired outcomes (Ganz et al., 2013). It provides a structured and process focused framework for approaching errors. The post fall huddles provide a mechanism to learn from the fall, near miss, or unexpected event (Degelau et al., 2012).

Post fall huddles or debriefings are held immediately after each event. The goal of the huddle is to identify root causes of the fall and decrease the potential for subsequent falls for that patient. Information obtained in the huddle is also used to identify gaps in the institution’s fall prevention standard of care. Data collected from the staff, eye witnesses, and the patient help to reconstruct the fall event. The data collected includes what happened, pre-existing risk factors, fall interventions in place at the time, and any injury incurred. After assimilating the data, an action plan is created and implemented. The clinical question is what are the root causes of inpatient falls at York Hospital? The purpose of this paper is to discuss data and data sources for evaluating root causes for inpatient falls at York Hospital. Root cause analysis process includes evaluating the patient’s contributing factors and fall interventions in place at the time of the fall and looking for opportunities for prevention improvement.
Data Sources

Nurse managers and house supervisors received training in root cause methodology and leading post fall huddles. The source for the data to be analyzed is gathered at the time of the fall during the post fall huddle. Ownership of the data is shared between the patient and the institution. Some of the data elements come from the electronic medical record and are patient owned. Other data elements are interventions completed by nursing staff and root causes identified through RCA. Post fall huddles are lead by nurse managers or the house supervisors within one hour of the fall event. The leader discusses what happened with all staff members caring for the patient around the time of the fall event. The event is reviewed with the patient and any witnesses whenever possible. Data is collected by these nurse leaders and provided by the staff caring for the patient, the patient, and any other witnesses. They enter the discovered findings into the event-reporting database, SRS. Findings are entered into SRS prior to the leader leaving the unit.

The SRS fields for fall reporting contain data elements that are important to track and analyze to prevent future falls for hospitalized patients. Data elements for each fall event include demographic information, medical record number, date and time of fall, unit where the event occurred, contributing factors placing the patient at fall risk, fall risk screening score, medications given prior to the event, fall interventions in place at the time of the fall, fall classification, a descriptive narrative, injury severity, injury treatment, root causes of the event, interventions initiated based on root cause findings, outcome/follow up narratives. The demographic and medical record information comes from the Eclipsys registration database. This information transfers automatically to the SRS system from Eclipsys. The fall risk score, contributing factors, and medication history are gathered by the nurses caring for the patient and
are stored in the electronic medical record. These data elements do not automatically populate the SRS fields. The nurse manager or house supervisor manually enters all data elements, except for the demographics and medical record numbers.

Data elements are answered by selecting one or more drop down choices for the questions being answered. There is reference material available to support some of the defined choices. For example, fall classification includes three discrete fall types: unanticipated physiological, anticipated physiological, and accidental (Morse, 2009). It is important for the leader to correctly identify the types of falls are occurring as fall prevention efforts are aimed at preventing anticipated physiological and accidental falls. The definitions for the fall types are in reference text. Some of the data fields are mandatory due to being required for reporting fall information to the state of Pennsylvania. Other mandatory information is required for reporting fall information to the National Database of Nursing Quality Indicators (NDNQI). The SRS file cannot be closed or completed unless the mandatory data is entered. Data of most importance to fall prevention are contributing factors, root causes, and interventions in place and added to the fall plan of care.

**Data Access**

The WellSpan networks have secured access management and control. User name and password is required to access any WellSpan electronic information and data. The entire system is encryption protected. WellSpan intranet (INET) is a system wide intranet with access to WellSpan corporate portals as well as portals for each WellSpan hospital. The event reporting system SRS is used system wide for reporting and is located on the INET. SRS is password protected and all staff can enter an event. There is administrative access to event viewing and reports. The patient safety officer grants access to the administrative functions.
Data entered into SRS downloads into Microsoft SQL server where it is organized into tables. SQL is a type of database that allows for queries to be built. There are no names associated with any of the data reported to protect the privacy of both patients and staff. For reporting purposes, all patient identifiers such as the medical record numbers are removed. Queries are created and pull data from multiple tables. The data management specialist uses SQL server management studio to create reports to support and answer query questions.

Fall data is accessed INET. There is a section of the department of nursing portal that stores all nursing dashboard data. The nursing dashboards have an additional level of security. A staff member wishing to view the dashboard must send a change order through IT, and the nurse manager must grant permission to access. The fall dashboard can only be accessed on a WellSpan computer or on a personal computer with secured home virtual private network (VPN) access. Permission to have VPN access is granted to by supervisors or directors for those needing to access the INET portals and Cerner in order to work at home.

The nursing dashboard is a monthly report of the nursing sensitive indicator metrics for each nursing department. The falls dashboard is one of the first system wide dashboards of this type (see Appendix for falls dashboard screen shot). Fall data available on the dashboard consists of the fall and fall with injury rate per 1000 patient days, as well as multiple data element reports. There are control charts automatically calculated for both fall rate and fall with injury rate. On the first screen is an overview of the entire hospital’s month-by-month total fall count. From the overview of the hospital there is a drop down that displays each service division and the number of falls by month per division. Each division has a drop down displaying each nursing unit within the division’s monthly falls. By clicking on the unit, the viewer is taken to a unit level dashboard that has the same layout as the hospital overview.
Strengths and Weaknesses

Strengths

Prior to the fall prevention work and post fall huddle process, managers knew the numbers of falls and fall and injury fall rates. There was no information regarding root causes, types of falls, or contributing factors for patients that were falling. After the post fall huddle process was put into place, the fall task force chairperson hand entered the SRS data into an excel spreadsheet template from the Institute for Healthcare Improvement. This was extremely time consuming as there were still 40-50 falls per month. Then the data management specialist was hired, and the fall task force chair worked with him to create the fall dashboard.

Data specific to each unit is available to the unit director, manager, and staff. The dashboard automatically updates three times each week so information is current. The manager can access information regarding specific data elements such as number of falls by day of the week and time of day. There are unit specific control charts for fall and fall with injury rates. Managers can grant access to the dashboard to staff members working on fall prevention for the unit to enhance process improvement ownership. The data does not have to be manually entered and audited from multiple by unit committee members. The dashboard can be access by multiple users at the same time.

Weaknesses

One of the greatest weaknesses of the data set is that the data integrity. The data is only as complete and accurate as the person entering it makes it. It is a “garbage in, garbage out” data set full of opportunities for human error (Seckman, 2014). There is variation in data elements completed depending on the nurse manager or house supervisor performing the post fall huddle and completing the SRS. Another weakness of the data set is that there is currently no interface
with Cerner Powerchart. No data currently pulls into the dashboard from Powerchart. If this interface were possible, objective data such as the patient vital signs, last medication doses, assessment findings at the time of the fall would be available for consideration as root cause for the fall event as well. Currently, this type of information is only available in the SRS description narrative. This narrative type of data is not able to be translated into any report and is very time consuming to analyze. It is all manually done and findings have to be manually recorded by the investigator. There is no natural language processing available (Cummins, Pepper, & Horn, 2014). The dashboard in its current state is a flat database model. The data is stored in the form of tables. The data specialist using the SQL report writer creates the queries. The relationships between data elements must still be manually analyzed. This is extremely labor intensive and requires knowledge and skill regarding contributing factors and root causes of falls.

**Data Analysis**

The falls task force members, nurse managers, directors, the chief nursing officer, patient safety officers, and ultimately the hospital board of directors examine fall data. NDNQI (2013) requires specific data elements are submitted monthly. Fall and fall with injury rates are calculated based on fall numbers and patient days as specified by NDNQI. NDNQI benchmark is a mean rate for same bed size hospitals. The goal is to be below the NDNQI mean fall and fall with injury rates. Fall and fall with injury rates are also submitted to the volunteer hospital association (VHA) of Pennsylvania. VHA benchmark for fall and fall with injury rate is a median rate for all participating hospitals. Fall data from York Hospital is analyzed for root cause trends, prevalent fall types, and contributing factors.

Fall data from SRS is organized into tables specific to each particular data element in the SQL database. Microsoft Excel or SPSS software contains descriptive statistical tests that may be
used to analyze the fall data from the SQL database. Descriptive statistics allows for exploratory analysis and summarization of findings (Trochim, 2006). Measures of central tendency and measures of variability are identified on the fall and fall with injury control charts. Measures of central tendency include the mean, the median, and the mode (Salkind, 2013). Quantitative data such as the fall rates are best described using the mean and the median. The control charts display the mean fall rate over a designated period of time. Variability is the measure of how values or scores compare or differ from the mean. The control charts also display the upper and lower control limits.

Frequency of each root cause or contributing factor can be shown using frequency distribution column or bar graphs (Salkind, 2013). Data elements from SRS are stored in SQL as tables. Pivot tables are used to rearrange the data in tables so that specific data elements can be viewed and displayed. Relationships among contributing factors and root causes can be identified using correlation. Correlation reflects relationships between variables. Scatter plots are one way to display correlation between variables. For example, a nurse manager of the stroke unit wants to see if there is any correlation between time of day and falls in patients with altered mental status.

Excel is available on any WellSpan computer system so there is easy access to these basic statistical tests. WellSpan’s Emig Research department has SPSS software and can help to generate more detailed data analysis. Further analysis of the data to evaluate current practice processes that are working to reduce falls is great future information to be gained from this dataset. Practice based evidence studies use current practice data along with bivariate and multivariate associations among multiple data elements to uncover best practices and treatments for a specific population of patients (Cummins, Pepper, & Horn, 2014).
Conclusion

Fall prevention is a major safety focus for healthcare institutions. Root cause analysis is used to identify what happened during the fall event to identify interventions needed to prevent future falls for the patient. Data collected into a falls database includes root causes, contributing factors, and other significant data elements. Evidence gleaned through the post fall huddle root cause analysis is trended and analyzed to identify interventions, treatments, and best safety practices for the fall risk patient cohort. Having this valuable information easily accessible assists the institution in successfully keeping patients safe from falls and fall related injuries.
References


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Retrieved from Agency for Healthcare Research and Quality website:

http://www.ahrq.gov


Falls Dashboard Screen Shot

12 MONTH SUMMARY w/ INJURY

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12 MONTH PRIOR/CURRENT YEAR FALLS/1000 Pts DAYS COMPARISON

FALL COUNT PERIOD COMPARISON

18 MONTH FALLS VOLUME

FALLS SUMMARY METRICS

18 MONTH RUNNING FALLS/1000PD CONTROL CHART

18 MONTH RUNNING INJ FALLS/1000PD CONTROL CHART