

UNASSISTED FALLS AND THEIR ASSOCIATION WITH VARIOUS  
NURSING WORKFORCE VARIABLES

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## ABSTRACT

**Purpose/Background:** Prevention of falls remains a high priority for hospitals, due to their negative effect on patient hospital stays and outcomes. Approximately 30% of falls result in some form of injury with 6 to 8% resulting in serious injury. Specifically, unassisted falls, which account for 85% of total falls in the hospital, can be particularly detrimental to patient outcomes and have a higher rate of patient injury with varying severity. On average, a patient who experiences a fall can expect their hospital stay to cost an additional \$4,322 more than a patient who does not fall. Current nursing research on falls is abundant; however, at present, the association between staffing numbers and falls is not well understood. The purpose of this study was to explore the unit-level association between the percentage of unassisted falls and three nursing workforce variables: total RN staffing hours per patient day, total non-RN staffing hours per patient day, and percentage of baccalaureate-prepared nurses.

**Theoretical/Conceptual Framework:** The Donabedian conceptual model of healthcare quality is being used as a framework in our study to examine structure and outcomes. Specifically, in our study, total staffing hours and RN level of education are structural variables, while the outcome was patient falls.

**Methods:** A cross-sectional, quantitative analysis using 2012 unit data for medical, surgical, medical/surgical, and rehab units in U.S. acute care hospitals. Only units participating in the National Database of Nursing Quality Indicators were included.

**Results:** Percentage of falls assisted varied by unit type. For RN staffing, a weak, positive relationship was shown for all four unit types in a general linear fashion. For Non-RN staffing, a weak, positive relationship was shown on surgical and medical/surgical units; however, rehab and medical units showed variation with no significant overall change or relationship noted. For percent BSN staffing, no clear association could be drawn except for a weak, negative relationship shown on rehab units.

**Conclusion:** According to our findings, a higher percentage of RN staffing on a given unit may be associated with higher percentages of assisted falls and lower percentages of unassisted falls. A clear association between falls and staffing could not be ascertained when analyzing the variables of non-RN staffing and percent BSN staffing. Current research shows that assisted falls are less likely to result in patient injury in comparison to unassisted falls. Preventing unassisted falls on the units remains a way to improve patient outcomes, decrease the length of hospital stays, and reduce injuries. According to our findings, bolstering the numbers of RN staffing may be a way to achieve this.

## INTRODUCTION

Patient falls continue to present a significant challenge and ongoing issue for acute-care hospitals, long-term care facilities, and community health clinics in the United States. This topic has received a considerable amount of attention devoted to research and findings,

both past and present, across the spectrum of academic institutions, government agencies, quality control agencies, and patient safety organizations (Staggs, 2013). Falls may contribute to a myriad of secondary issues in the hospital setting, including a higher likelihood of severe injury (e.g. hip fracture, traumatic brain injury), extended patient stays, higher rates of discharge to institutional care, and overall worsened patient outcomes (Oliver, 2010). An additional factor in the analysis of this topic is the tremendous costs that the hospital may incur as a result of a patient falling. According to an analysis in the American Journal of Medicine, a patient suffering a fall who sustains injury is reported to have hospital charges over \$4,200 higher than patients who do not fall (Hitcho, 2004). The Joint Commission Center for Transforming Healthcare estimates an even higher financial cost of \$14,056 in total costs related to interdisciplinary treatment and secondary infection ("Facts about," n.d.). In addition to the physical harm, patients may also experience significant emotional distress and depression, and relegate them to a lower level of functioning that often does not return to pre-injury levels (Scaf-Klomp, 2003). The collective financial and emotional burden placed on both patient and hospital due to a hospital-acquired condition that is often preventable such as falls stands as reason for further research.

Despite bolstered efforts to predict and treat this issue, falls among hospital inpatients remain a common occurrence, generally ranging from 2.3 to 7 falls per 1,000 patient days (Hitcho, 2004), or according to research from the Agency for Healthcare Research and Quality, between 700,000 and 1,000,000 annual falls in U.S. hospitals ("Preventing falls," 2013). More alarming statistics present with the severity of these falls. The Agency for Health Research and Quality purports that approximately 1%, or 11,000 falls annually, end

in patient death in the hospital in-patient setting (AHRQ, 2008). Approximately 30% of inpatient falls will result in some form of injury, with more serious injuries occurring in 4% to 6% of those incidents (Hitcho, 2004).

In the discussion of falls, an important distinction to contemplate is the difference between assisted and unassisted falls. While injuries associated with falls are an important measure of patient care and safety, the rate of unassisted falls can enlighten further regarding the efficacy and quality of nursing care provided (Staggs, 2012). An assisted fall describes a patient who, during their fall, is aided by a hospital staff member who attempts to break the fall in some manner, thereby mitigating the more devastating effects. By contrast, an unassisted fall occurs in the absence of such aid, and depicts a more preventable incident (Staggs, 2012). This important distinction drives the basis of this paper and seeks to understand the role of nursing workforce variables in unassisted falls.

## **GAPS IN LITERATURE**

Although current research abounds on falls, including risk factors and predictors of falls, much of the literature focuses on elderly adults in community or long-term care facilities (Hitcho, 2004, p. 732). Less focus is present regarding inpatient falls in acute-care hospitals and even less literature has focused on nursing variables related to assisted and unassisted falls.

## **PURPOSE**

The Institute of Medicine released their annual report, *The Future of Nursing: Leading Change, Advancing Health*, wherein they detailed a current movement for 80% of the nursing workforce to attain BSN education by the year 2020 (Institute of Medicine [IOM],

2010). Although current research exists on nurse staffing levels and their association with fall rates, the level of education attained by a nurse and its association with percent of unassisted falls has not been well-established. Level of education remains an important consideration in determining the reasoning behind unassisted falls. With BSN nurses gaining additional training and coursework not present in ADN or LPN programs, such as professionalism, quality improvement, and leadership, it was a goal of the study to determine whether this additional knowledge would translate into a better understanding and recognition of fall risk factors through honed critical thinking skills. Therefore, the primary purpose of this study was to examine a relationship between three nursing workforce variables (RN hours per patient day, non-RN hours per patient day, and percent of BSN-prepared staff) and the percent of unassisted falls at unit-level in acute-care hospital units.

## **THEORETICAL FRAMEWORK**

The Donabedian conceptual model of healthcare quality was used as a framework in our study to examine structure and outcomes. In this model, structural variables denote the context in which care is delivered, such as healthcare institutions, facilities, and staff, whereas outcome variables describe the effect on the studied population. Specifically, in our study, total staffing hours and RN level of education represented the structural variables, while the outcome is represented by the percent of falls.

## METHODS

### DESIGN

This cross-sectional, quantitative secondary analysis intended to examine existing gaps in the literature. We examined three unit-level workforce variables for potential associations with the percent of falls assisted: RN staffing, non-RN staffing, and percent of baccalaureate-trained RNs.

### SAMPLE

Monthly, unit-level data was obtained from the National Database for Nursing Quality Indicators (NDNQI) for the year 2012. The NDNQI collects nursing-related data from over 1,900 participating U.S. hospitals, representing approximately one-third of all U.S. hospitals and a diverse array of academic institutions, teaching hospitals, and community (non-teaching) hospitals. Since reporting to the NDNQI is voluntary, the sample was not considered random, nor is it necessarily representative of the population of U.S. hospitals in general. The sample was limited to medical, surgical, combined medical/surgical, and rehabilitation units. Unit-months with missing data on staffing or falls were excluded. In total, complete data were available from 6,786 units.

### ANALYSIS

Percent of assisted falls were computed for medical, surgical, medical/surgical and rehab units. We aggregated the data across months for each unit to compute annual RN staff hours per patient day, Non-RN staff hours per patient day, and Percent of staff with BSN education. For graphing purposes, we converted these to decile scores based on where

each unit ranked in relation to the other units of its type. The dependent variable measured was the percent of falls assisted on each unit for the year.

We computed Spearman correlations to assess and test the strength of association between each of the three predictor variables and the percent of falls assisted for each unit type.

## RESULTS

Associations between percent of falls assisted and the three predictor variables varied by unit type. For RN staffing, a weak, positive relationship was shown for all four unit types in a general linear fashion (see Figure 1). For Non-RN staffing, a weak, positive relationship was shown on surgical and medical/surgical units; however, rehab and medical units showed variation with no overall relationship noted (see Figure 2). For percent BSN staffing, no clear association could be drawn except for a weak, negative relationship shown on rehab units.

Spearman correlations are shown in Table 1. Although several correlations were significant at the  $\alpha=.01$  level, the correlations were weak, indicating small effects.

TABLE 1 SPEARMAN CORRELATIONS BETWEEN PREDICTOR VARIABLES AND PERCENT OF FALLS ASSISTED.

Unit type	RN hours per patient day (RNHPPD)	Non-RN hours per patient day (Non-RNHPPD)	%BSN
Medical	0.21*	0.04	0.02
Surgical	0.20*	0.09	0.03
Medical-surgical	0.17*	0.09*	0.07
Rehabilitation	0.27*	0.05	-0.09

\* p-value < 0.01

## FIGURES

Figure 1 RNHPPD Decile

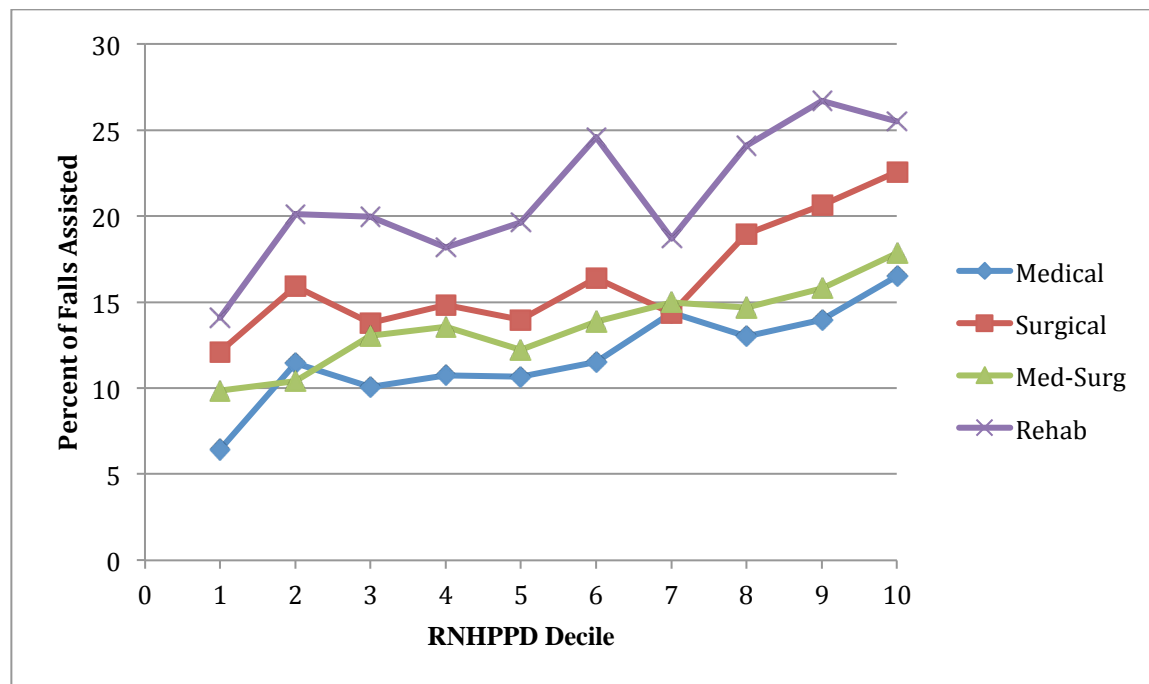


Figure 2 Non-RNHPPD Decile

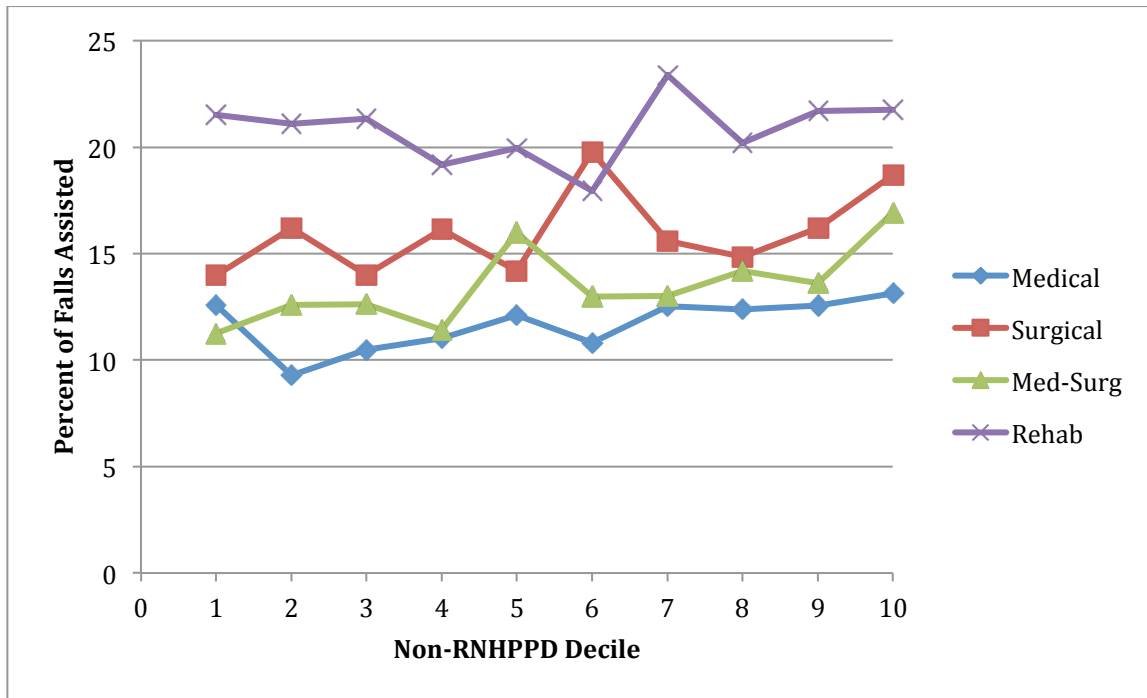
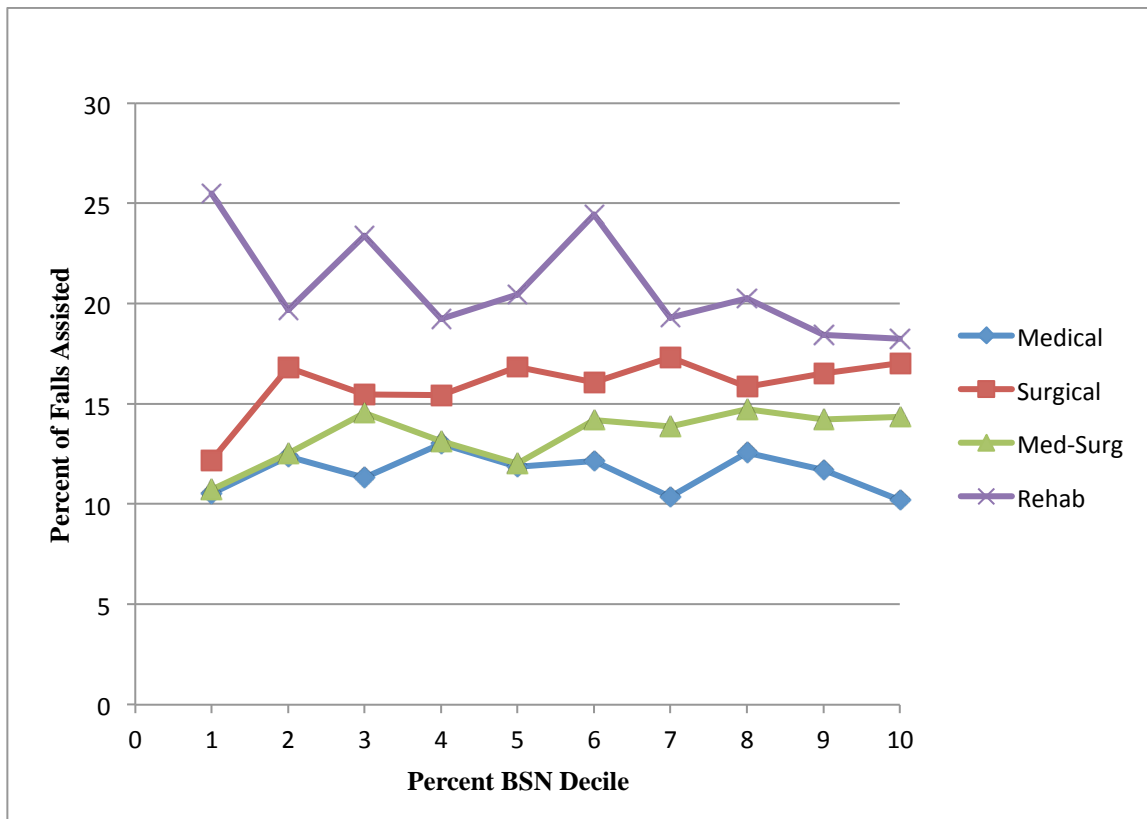


Figure 3 Percent BSN Decile



## DISCUSSION

Nurse staffing level and staffing characteristics have been studied in previous research and determined to be important factors in rates of falls (Staggs, 2012). The results of this study support the assertion that at least one workforce variable, RN staffing, may also be important in understanding and preventing unassisted falls as well. The unassisted fall rate does not show an association in relation to non-RN staffing hours; however, a general linear association is noticed in relation to RN staffing hours. No such association can be ascertained in relation to BSN staffing and percent of unassisted falls. Several potential limitations were found to exist within this study. As mentioned earlier, the sample was not random or representative of the general population of U.S. hospitals; therefore, the difference among acute-care units in NDNQI and non-NDNQI hospitals may be significant. Another limitation concerns the absence of a control variable for individual patient characteristics related to risk of falling, such as comorbidities, impaired gait, and polypharmacy.

Current research shows that assisted falls are less likely to result in patient injury in comparison to unassisted falls. Preventing unassisted falls on the units remains a way to improve patient outcomes, decrease the length of hospital stays, and reduce injuries. According to our findings, bolstering the numbers of RN staffing may be a way to achieve this. However, further research is necessary in order to determine the association that level of education has with unassisted falls.

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