

COLLEGE OF HEALTH SCIENCE FACULTY GRANT-IN-AID REPORT

PROJECT TITLE: Testing a Typology of Factors that Influence the Relationship
Between Transformational Leadership and Patient Safety Outcomes

INVESTIGATOR: Shelly Fischer YEAR PROJECT WAS SUPPORTED: 2014

Purpose: to test hypotheses regarding mediating/moderating effects of intervening factors, as well as relationships among leadership behaviors and patient safety outcomes.

Participants/Subjects: The study analyzed data from 81 nursing units, within 11 hospitals that were all part of one large hospital system. Unit types included: Medical, Surgical, Combined Medical/Surgical, Stepdown, Intensive Care, and Rehabilitation.

Methods: This was a secondary analysis of three existing databases. Pearson Product-Moment correlation was used to examine relationships among independent and dependent variables. Multiple regression models were used to analyze the collective and separate effects of the independent variables (Leadership Effectiveness - 2 composite measures, Staffing Adequacy – 11 measures, Nurse Characteristics – 2 measures, Safety Climate - 1 composite measure) on the dependent variables (Pressure ulcers, Falls, CLABSI, CAUTI). For PSO analysis, Bayesian methodology accounted for the rare event outcome variables. Hospital size, unit type, hospital case mix index, and catheter utilization ratios served as control variables.

Results

- An increase in the number of nurses with BSN or higher degrees was moderately related to a lower % of patients with Hospital Acquired Pressure ulcers ($r = -.300, p = .007$).
- An increase in the number of nurses with BSN or higher degrees was moderately related to lower injury fall rates ($r = -.347, p < .001$).
- An increase in the overall perception of safety was moderately related to a decrease in injury fall rate ($r = -.427, p = .020$).
- An increase in the percentage of staff that were RNs was moderately related to an *increase* in the rate of Catheter Associated Urinary Tract Infections ($r = .250, p = .011$).
- A significant regression equation was found between percent of patients with Hospital Acquired Pressure Ulcers based on nursing staff with BSN or higher educational preparation and the percentage of total nursing staff that were RNs ($F(19,61) = 2.201, p = .011$), with an R^2 of .222.
- A significant regression equation was found Injury Fall Rate based on nursing staff with BSN or higher educational preparation and the overall perception of safety on the unit ($F(19, 61) = 5.531, p < .001$), with an R^2 of .518.
- A significant regression equation was found between the rate of Catheter Associated Urinary Tract Infections based on the percentage of nursing staff that were RNs. ($F(13, 67) = 2.146, p = .022$), with an R^2 of .157.

Limitations: Tests for mediation and moderation on individual outcome variables were not performed as planned. Units with greater than two quarters of missing data were eliminated, which may have inadvertently created a nonrandom selection of units with subsequent influence on results. In addition, there was no control for patient acuity variance among the units, just among hospitals.

Conclusions

Results reinforce the value of increasing percentages of BSN prepared nurses, even when a financial investment is made to incent BSN hiring, a return on investment comes in the form of cost avoidance through decreased adverse events, such as injury falls and pressure ulcers. Further research is needed to understand the relationship between increased RN skill mix and increased incidence of CAUTI, though acuity may be the answer. Case mix index was reported at the hospital level, not the unit level.

Future Research & Dissemination

- Manuscript in progress for Journal of Nursing Administration: BSN Preparation and Safety Outcomes: Predicting a Return on Investment
- CAUTI and staffing mix – need further study to understand results of increased CAUTI with increase in RN skill mix
- “Staffing Adequacy” – need further study to understand potential as composite indicator/test as latent variable
- mediation and moderation effects of staff characteristics and staffing adequacy between leadership effectiveness and safety outcomes (Falls and HAPU) – need to run statistical tests with individual variables and analyze