2015

Moving from Productivity to Professional Value Model of the Hospital-Based Registered Nurse

Crystal Maree Billings
Walden University

Walden University

College of Health Sciences

This is to certify that the doctoral study by

Crystal Billings

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. Allison Terry, Committee Chairperson, Health Services Faculty
Dr. Janice Long, Committee Member, Health Services Faculty
Dr. Dana Leach, University Reviewer, Health Services Faculty

Chief Academic Officer
Eric Riedel, Ph.D.

Walden University
2015

Abstract

Moving from Productivity to Professional Value Model of the Hospital-Based Registered Nurse

by

Crystal Maree Billings

MN, University of Washington, Tacoma, 2009

BSN, University of Washington, Tacoma, 2002

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

November 2015

Abstract

There is a gap between organizational commitment to professional value of the nurse and the achievement of quality outcomes. This study explored the relationship between the productivity model and the professional value (PVS) model of the hospital-based registered nurse (RN). It was essential to understand how to measure nursing's contribution to patient care as a means to promote patient care outcomes. The current professional nursing dynamic provides an unprecedented opportunity for nurses to achieve their highest professional potential through increased demonstration of advocacy and accountability for the central tenets of nursing. The intent of this project was to explore the elements of the professional nursing workforce in a modern-day hospital. This study was conducted on the medical, surgical, progressive care unit (PCU) and critical care unit (CCU) of a community-based acute care hospital Washington State. A quantitative approach was undertaken utilizing a descriptive correlational study design. RNs on the identified units received electronic invitation and survey via organizational email system, resulting in a participation rate of 47.1% (N=48). The study found that PVS model achievement explained patient outcome variable variance (fall rate 86.4%, HAPU 83.1% and CAUTI 40.9%). Further, large effect size (98%) with work unit variance was demonstrated with PVS model achievement. The innovative PVS model was found to demonstrate a statistically significant difference from existing productivity model, and alignment of RN staffing with organizational quality goals. Recognizing the professional value of the RN could promote meaningful change in the healthcare landscape and optimize patient care and quality outcomes.

Moving from Productivity to Professional Value Model of the Hospital-Based Registered Nurse

by

Crystal Maree Billings

MN, University of Washington, Tacoma, 2009

BSN, University of Washington, Tacoma, 2002

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

November 2015

.

Acknowledgments

The road to achieving my Doctor of Nursing Practice (DNP) degree has most assuredly been a long and challenging one. While I had considered I would pursue doctoral level education, it was the philosophy of the DNP that called to me both personally and professionally. And as such, I embarked on this academic journey. However, the path was fraught with challenges and without the encouraging words of support from my family and friends; I would not have been able to achieve my academic goals. It is with heartfelt thanks that I recognize my family, especially my husband Ron, daughter Emily and son Kaare, and many friends, who encouraged me to find the courage to pursue my dream.

And a special thank you to my site mentor, Karen Grefe, whose guidance and coaching allowed me to develop an organized structure for my project concepts. Not only did Karen serve as a relentless student advocate, but she challenged my assumptions and encouraged me to achieve academic excellence. I am grateful for her encouragement and support.

Finally, I would be remiss if I did not thank my Walden committee members, but most specifically my chair, Dr. Allison Terry. Without her words of encouragement and her positive energy, I would not have continued to struggle with the seemingly insurmountable challenges I experienced through my educational tenure with Walden University. Her passionate commitment to add “jet fuel” to my project was just the encouragement I needed to refocus and achieve my academic goal. Thank you, Dr. Terry, for your support.

Dedication

Dedicated to the inner student in all of us.

May the quest for learning be a lifelong adventure.

Table of Contents

List of Tables

List of Figures

Section 1: Overview of the Evidence-Based Project

Introduction

Nursing is often identified as the backbone of the health care delivery system (Dubois, D'Amour, Pomey, Girard, & Brault, 2013). The foundation of nursing includes care coordination, caring partnerships with the patient and family, and professional work environment. Together, these elements facilitate the expression of the professional ethical considerations of nursing care and are the frameworks that promote safe, efficient, quality patient care. Often the value of the professional, hospital-based RN is not fully recognized amid healthcare system and organizational factors.

Historically, nursing's roots are enmeshed in the caring and cultural-societal discourse as the central tenets of the nursing profession (ANA, 2010; Kelley, Connor, Kun, & Salmon, 2008). These tenets of nursing are demonstrated in the complex human interaction through the nurse-patient connection and serve to exemplify professional nursing practice. This holistic approach to the human experience is the hallmark of the nursing profession and provides the foundational element for the provision of safe patient care delivery systems, and the realization of quality outcomes.

The current professional nursing dynamic provides an unprecedented opportunity for nurses to achieve their highest professional potential through increased demonstration of advocacy and accountability for the central tenets of nursing. The intent of this project was to explore the various elements of the professional nursing workforce in the modern-day hospital organization.

Background and Context

Nursing represents the largest group in the healthcare workforce. Weis and Schank (2009) stated that "professional values are the foundation for practice" (p. 222). However, the value nursing knowledge and expertise bring to the organization, and patient care outcomes may be difficult to quantify. While significant research has been undertaken, typically the methodology to express nursing's value is through the economic lens in terms of financial cost (Goetz, Janney, & Ramsey, 2011; Graf, 2006; Jones & Yoder, 2010; Keepnews, 2013). Rarely is nursing identified as a potential revenue stream. Because of this historic context, nursing is often viewed as an expense to be reduced rather than recognized as a means to achieve improvement in patient care outcomes. Therefore, the full power of the nursing workforce to enhance the health delivery system remains undefined.

"Nurses maintain a unique partnership with their patients in an organizational system that is designed to influence the health and well-being of society and professional nursing" (Kelley et al., 2008, p. 8). However, to clearly define the professional value of nursing, greater understanding of the impact of direct nurse staffing on patient outcomes in light of the professional practice environment is essential. Hinno, Partanen, and Vehvilainen-Julkunen (2011) assert that "it is probably not possible to identify ideal staffing systems if the quality of working environments and workload are not considered (p. 1585). As a result, to define professional value staffing levels, patient outcomes, and practice environments must be considered as an aggregate to understand the full complexity of this concept.

Problem Statement

Healthcare delivery systems in the United States have rapidly changed over the past several decades (Weis & Schank, 2009). The role of the RN in the hospital setting has transitioned in response to the increasing complexity of this new health care dynamic (Kirwan, Matthews, & Scott, 2013; McDonough, 2013). While nursing care delivery has evolved, the means to measure nursing productivity have remained stagnant. The healthcare arena is highly complex, and administrators have been unable to quantify nurse value because of this complexity. Without an appropriate means to measure the professional value of nursing, administrators have relied on productivity formulas that are outdated and at times inaccurate. As a result, organizational efforts have focused on controlling costs, often through the elimination of RN staffing, rather than on enhancing quality patient care outcomes through the development of the professional value of the nursing staff.

Over the past decades, significant research has focused on the appropriateness of the business model approach as it relates to the healthcare industry. Optimal patient care outcomes have been studied in relation to appropriate nurse staffing levels (Goetz, Janney, & Ramsey, 2011; Harper, 2012; Jones & Yoder, 2010; Keepnews, 2013; NDNQI, 2012; NQF, 2012a). In order "to reframe the nursing practice into an economic equation that captures the cost, quality, and services, a paradigm shift in thinking is needed in order to assess work redesign" (Upenieks, Akhavan, & Kotlerman, 2008, p. 294). While many researchers have focused on this issue, a standardized means to identify a productivity model that accounts for nursing quality through improved patient

care outcomes, while supporting the nursing practice environment has yet to be developed. Therefore, the value of the professional nurse in the healthcare delivery system has yet to be clearly articulated or accurately measured.

The nursing profession supports individuals from a holistic approach. This multifaceted approach promotes patient safety and quality outcomes (JCAH, 2009; Kirwan, Matthews, & Scott, 2013; Myny, Van Goubergen, Gobert, Vanderwee, Van Hecke, & Defloor, 2011; NQF, 2012a). However, the unilateral focus on nursing productivity as a single economic measurement for success degrades nursing professional value. It minimalizes the vital underpinnings of the nursing profession and trivializes the true professional value of the RN to patient safety and care outcomes.

Current models of productivity measurements fail to take into consideration the value of the RN's contribution to the financial success of the hospital organization (Keepnews, 2013). The broader vision of the professional value of the nurse represents an opportunity for improved patient care quality (Jones & Yoder, 2010; Keepnews, 2013; McHugh, Berez, & Small, 2013). When the full value of the professional nurse is recognized, cultivated and invested in, the long-term organizational fiscal viability is assured. Organizational sustainability can be attained through achievement of quality metrics and patient safety standards (Jones & Yoder, 2010; Keepnews, 2013; McHugh et al., 2013).

Purpose Statement and Project Objectives

Purpose Statement

The purpose of this project was to explore the relationship between the current productivity model utilized by the research site and the proposed professional value model of the hospital-based RN. Organizational determinants of productivity and practice environment represent the underlying organizational value placed on nursing. The result of this dynamic interplay can be measured utilizing patient care outcomes. The ability to clearly measure RN professional value would provide administrators a tool to establish bedside RN staffing levels needed to achieve organizationally defined patient care outcomes.

To explore these bonds, the current productivity formula of the research site, hours per patient, was recalculated utilizing the National Database of Nursing Quality Indicators (NDNQI) endorsed productivity definition of nurse care hours (NCH) (NDNQI, 2012). Further, an investigation into the effects of productivity expectations about the professional value of the hospital-based RN staff on the medical, surgical, PCU and CCU, through standardized instruments was undertaken.

Project Objectives

Project objectives included a) exploration of organizational productivity standard and the investment in nursing through the practice environment and burnout instrument constructs; b) exploration of relationship between the quality and nursing composites, and productivity achievement; and c) exploration of the combined effect of the constructs as a

means to explore the relationship between existing productivity standard and the proposed professional value model productivity metric.

Significance/Relevance to Practice

Patient care quality outcomes have been called into question over the last several decades (Jones et al., 2010; Kangasniemi, Vaismoradi, Jasper, & Turunen, 2013; NQF, 2012a). With rising healthcare costs, significant focus has been placed on improving effectiveness and efficiency of nursing staff as a means to promote fiscal viability and promote patient care outcomes (Kohr, Hickey, & Curley, 2012). Through this dynamic process, hospital-based nursing staffs have been called upon to maintain or exceed safety and quality expectations, often with decreased availability of nursing hours. This approach is ineffective and detrimental to patient care outcomes. However, without clearly defined metrics to demonstrate the professional value of nursing in quality outcomes, minimal change can be expected (Harper, 2012). Clear connections between patient care outcomes and the professional value construct need to be established. With this recognition increased engagement and adoption of new practices can be achieved (Harper, 2012).

Research has established a relationship between burnout and staffing (Kirwan et al., 2013; McHugh et al., 2012; Pisanti, Lombardo, Lucidi, Violani, & Lazzari, 2012). Nurse practice environment and patient safety correlation has also been demonstrated (Keepnews, 2011; Klaus, Dunton, Gajewski, & Potter, 2013; McHugh et al., 2013; McKenna, et al, 2011; Shever, 2011; Spetz, Donaldson, Aydin, & Brown, 2011). However, there remains a recognized research gap between organizational investment in

and commitment to the professional value of the nurse and the achievement of quality outcomes. As no consistent means is utilized to measure the complex concept of the professional value of the RN, a practice gap exists.

Project Question

What is the relationship between an innovative productivity model, patient outcomes (falls, hospital-acquired pressure ulcers (HAPU) and catheter-associated urinary tract infections (CAUTI)), and nurse burnout and nurse practice environment?

For this project, the research question is framed utilizing the PICO model (White, & Dudley-Brown, 2012). P = the hospital-based RN; I = productivity model for healthcare innovation; C = current productivity model compared with an innovative productivity model in relation to value-added care of the hospital-based RN; O = the professional value of the hospital-based RN recognized through development of new productivity model that capitalizes on their direct impact on patient care outcomes. The identified intervention is the application of the NDNQI definition of NCH calculated against identified quality outcomes in effort to definitively measure the professional value of the nurse (professional value = nursing composite/quality composite). Further, in comparative analysis, the PVS of the research site was analyzed against national benchmarks.

Evidence-based Significance of Project

There is saturation of data in the nursing and medical literature regarding suboptimal patient care delivery and substandard patient care outcomes in modern-day hospital facilities (Hinno, Partanen, & Vehvilainen-Julkunen, 2011). Unfortunately, since

the alarming Institute of Medicine report published in 1999, *To Err is Human* (IOM, 1999), sustained change has not occurred (Shever, 2011). It was essential to examine the processes that contributed to this detrimental trend and to employ evidence-based innovation to our healthcare delivery systems.

In the early 1980s, faced with new regulatory controls of Prospective Payment system (Keepnews, 2013; Lake, 2007), hospital administrators eliminated nursing staff as a method to control costs and improve efficiencies. Widespread utilization of economic-based productivity calculations was employed. This decisional pathway created intense RN dissatisfaction with organizational directives. RN turnover and suboptimal staffing levels resulted (Aiken, Sloane, Bruyneel, Van den Heede, & Sermeus, 2013; Culver Clark & Allison-Jones, 2011; Upenieks et al., 2008; Weis et al., 2009). Unfortunately, other unanticipated results of this financial strategy became evident in the form of reduced healthcare safety and quality.

In the 1990s, healthcare reform continued with the growth of managed care payment structures. Administrators turned to utilization of less skilled healthcare workers in delivery of patient care and further downsized RN staffing capacity (Carayon & Gurses, 2008; DeVillers & DeVon, 2012; Jones et al., 2012; McGillis Hall, 2003; Myny, et al, 2011; Upenieks, et al, 2008; Weis et al., 2009). Reduced quality and poor patient care outcomes resulted from these cost-saving initiatives (Culver Clark & Allison-Jones, 2011; Graf, 2006; Jones et al., 2010; Morris, MacNeela, Scott, Treacy, & Hyde, 2007; RWJF, 2008). At this time, a significant body of literature demonstrates “a link between nurse staffing and improved patient care outcomes” (Keepnews, 2013, p. 1).

Unfortunately, unrelenting focus on the RN workforce as a means to manage healthcare costs continues.

Recent legislative changes have been designed to provide healthcare organizations an opportunity to control costs while achieving healthcare excellence (JCAH, 2009; McDonough, 2013; McHugh et al., 2013). Pay for performance has required hospital administrators to make tough decisions. Again, RN staffing reduction was used as a means to achieve the desired success. The opportunity to make significant and lasting changes in the healthcare arena is at hand. Investment in human capital and development of the professional value of the bedside nurse is the key.

With the introduction of penalties for suboptimal patient care quality, the lessons of the past should be a strong vehicle to promote informed decisions. Unfortunately, many organizations continue to see the nursing profession in terms of expense, rather than as a vehicle to reduce costs through improved quality outcomes. This view represents a misunderstanding and misinterpretation of the professional value the RN provides an organization. "Improved understanding of nursing's economic value is a tool for explicating and asserting its broad value – both economic and social" (Keepnews, 2013, p. 2) is essential to lasting healthcare change. Achievement of optimal patient safety and quality outcomes can finally be realized through increased awareness of the professional value of nursing.

Implications for Social Change in Practice

The stakes for social change in practice are significant. "Nursing brings to the future … a steadfast commitment to patient care, improved safety and quality, and better

outcomes" (Keepnews, 2013, p. 3). With population growth and increasing chronic health management needs, a flourishing, well-informed nursing staff is required. Through investment in nursing potential, organizations and governmental regulators have a significant opportunity to improve the healthcare delivery system. However, this change will not occur without appropriate action and solutions that bring to light the professional value of the bedside nurse. Continued reliance on simplistic productivity measures fails to demonstrate the complexity and richness of the nursing profession and only serves to trivialize the professional value of the RN in the current healthcare setting. "Positive change will not occur in healthcare delivery unless the status quo around making and following rules is challenged" (AHA, 2013, p. 5).

Definition of Terms

Hours per patient day (HPPD) represents the total number of hours of all staff assigned to the unit divided by patient day. HPPD is the current metric utilized by the research site and represents the broadest definition of productivity.

Nurse care hours (NCH) is defined as "the number of productive hours worked by nursing staff (RNs, LVNs/LPNs, and UAP) assigned to the unit who have direct patient care responsibilities for greater than 50% of their shift" (NQF, 2012a, p. 1). NCH represents the NDNQI endorsed definition adopted in November 2012 (Choi, Boyle, & Dunton, 2014). This standardized formula allows for exploration of nurse staffing in the quality discourse as a consistent and accurate measurement tool.

Midnight Census (MC) is the total number of inpatients present on the unit at midnight. Current research found the MC is an inaccurate measurement tool. MC does

not accurately capture the patient care activities occurring throughout the 24-hour day. As a result, it does not accurately reflect the staffing needs necessary to care for this fluctuating patient volume (Goetz et al., 2011; Keepnews, 2011; NQF 2012a). Keepnews (2011) suggests that the "priority should be to discontinue the use of the MC – which fails to reflect admissions, discharges and other events that significantly affect needs for nursing care – as a basis for determining staffing" (p. 12).

Patient Days, Actual Hours (PDAH) is the most accurate measure of a unit census (NQF, 2012a). It represents the sum of actual hours for all patients on a unit in a twenty-four hour period.

Professional Value of the RN is defined as achieving "the best outcomes for the resources invested" (Aiken et al., 2013, p. 144). For this project, outcomes are defined in terms of quality outcomes as defined by the rate of hospital-acquired complications (falls, HAPUs, and CAUTIs). The Quality Composite (QC) is comprised of these variables. The Nursing Composite (NC) represents the organizational investment in resources. NC demonstrates optimal staffing levels using NDNQI adopted standard definitions. I measured nurse work environment measurement utilizing the Staffing and Resource Adequacy (S) and Foundations of Quality Care (Q) subscales of the Practice Environment Score-Nursing Work Index (PES-NWI) instrument. I measured stress using the Emotional Exhaustion (EE) subscale of Maslach Burnout Inventory (MBI) instrument. I utilized nursing literature to establish national baselines (JCAH, 2009; NQF, 2012a). I then calculated the PVS which was stratified by the nursing unit. The PVS composite score is a calculation of the NC score and QC score for each unit. The

organizational PVS composite will be calculated in the above-described manner and compared with the established PVS baseline for each unit.

The NC baseline calculation used NCH mean (NQF, 2012a), the MBI-EE factor analysis mean (Kalliath, O'Driscoll, Gillespie, & Bluedorn, 2000), and the PES-NWI/S and PEW-NWI/Q subscale means from the Joint Commission on Accreditation of Healthcare (JCAH) pilot project (JCAH, 2009); (see Table 1).

Table 1

NC scores, by unit, utilizing national benchmark data

Baseline Calculations					
National NC Baseline					
Unit	NCH_1	$MBI\text{-}EE_2$	$PES\text{-}NWI/Q_3$	$PES\text{-}NWI/S_4$	Composite Score
Medical	8.95	2.46	2.66	2.96	17.03
Surgical	9.18	2.46	2.66	2.96	17.26
Progressive Care	10.83	2.46	2.66	2.96	18.91
CCU	17.44	2.46	2.66	2.96	25.52

1 – NQF, 2013a
2 – Kalliath et al, 2000
3 – NQF, 2012b; JCAH 2009
4 – NQF 2012b; JCAH 2009

The QC model represents the unit mean for falls (per 1000 patient days) (Calnoc, 2014), rate of HAPU (Calnoc, 2014), and National Healthcare Safety Network (NHSN) rate of CAUTI (Dudeck, et al., 2013); (see Table 2).

Table 2

QC Scores, by unit, utilizing national benchmark data

Baseline Calculations				
National QC Baseline				
Unit	$Falls_1$	$HAPU_2$	$CAUTI_3$	Composite Score
Medical	2.85	0.04	1.4	4.29
Surgical	2.85	0.04	1.4	4.29
Progressive Care	2.39	0.11	1.8	4.3
CCU	1.05	0.3	2.9	4.25

1, 2 – Calnoc, 2014

3 – Dudeck, 2013

These conceptual construct of nursing professional value encompasses nursing from a global perspective. The variables align the productivity measure and efficiency of the nursing workflow while encompassing the strengths of the nursing profession to promote patient care quality.

Assumptions

Assumptions include that current productivity model utilized is not effective in measuring nursing value. Additional assumptions include that patients, healthcare administrators, governmental bodies, and members of the nursing profession are engaged and motivated to ensure improvements in patient safety and achievement of quality outcomes. Further assumption includes that the hospital-based RN is an essential stakeholder in this discourse. Additionally, it is assumed that health care administrators support the professional achievement of the RN. Finally, it is assumed that all

stakeholders recognize the need for improved efficiencies and cost containment measures within the health care arena and are committed to achieving these objectives.

Scope and Delimitations

The practice problem addressed in this DNP project includes investigation of the hospital-based RN on the identified inpatient nursing units. The project explores the level of burnout, quality care and staffing as measured through reliable and validated survey tool instruments. The project also reviews productivity and quality data of the research site. The project focus was selected related to the extensive literature regarding inpatient errors and failing quality outcomes, as well as inpatient RN staffing challenges related to burnout and turnover. The impact of these two forces is devastating on the health of our nation and when addressed in tandem may afford dramatic and sustainable change to our healthcare delivery mechanisms in the hospital-based setting. The project focused on four unit types, medical, surgical, PCU, and CCU as a wealth of data were available for utilization of national comparatives.

Limitations

Limitations may include the ability to obtain consistent data for direct comparisons. Further limitations include the difficulty in defining the professional value of the RN with direct nexuses, which has represented a consistent dilemma for prior researchers, discussed in detail in literature review section. Additionally, limitations may exist in that individual members of the nursing profession may not embrace practice change. Finally, as a passionate and committed member of the nursing profession, it is

recognized that bias may be introduced by the writer, and this could present a study limitation if not appropriately controlled.

Contributions to Nursing Practice

Without clear definitions, the professional value of the hospital-based RN to optimal patient care outcomes cannot be definitively expressed. Without this definition, the value the RN brings to the hospital-based organization cannot be clearly measured. The inability to effectively measure the true value of the RN results in misunderstanding and misrepresentation of staffing needs in the complex hospital-based patient care arena. An easily obtained yet multidimensional formula for measuring the professional value of the nurse to drive excellence in patient care outcomes is needed to support organizational decisions, and will serve as a means to demonstrate this linkage. As a result, it is hoped that informed staffing decisions to support organizational quality objectives can be established, measured and achieved.

Summary

While readily recognized that nursing represents the largest group of the healthcare professions (DeVillers et al., 2012; Jones et al., 2010; Kirwan et al., 2013; McGillis Hall, 2003; McHugh et al, 2013; NQF, 2012a, 2012b), the measurable impact of nursing expertise on patient care outcomes remains elusive. The heavy reliance by healthcare organizations on nursing productivity formulas serves only to demoralize the profession of nursing without achievement of excellence in patient care outcomes. Through innovation and groundbreaking approaches to and investment in the professional

value of the nurse, hospital administrators can achieve the desired balance between cost, efficiency and quality.

Section 2: Review of Literature and Theoretical and Conceptual Framework

Introduction

Literature review search for pertinent papers was accomplished using CINAHL Plus, MEDLINE, Academic Search, Elsevier, and PsychoINFO databases, focusing on literature between 2005 and 2014. Additionally, literature prior to 2005 was specifically queried using the databases mentioned above as a historical basis for exploring the roots of the productivity discourse. Articles were excluded that were not available in English. Papers were also excluded if they did not relate to the hospital-based nursing environment. Keyword search included "professional value", "nursing productivity", "nurse staffing", and "patient care outcomes". Papers were selected based on their congruence with the project objectives. Further, snowballing was utilized to augment literature value and relevance to the research topic and resulted in an additional 12 articles for inclusion in the project. Finally, all articles were assessed and categorized based on the following productivity themes: 1) nurse staffing; 2) cost containment; 3) work environment, and 4) professional value. A total of 217 papers were reviewed, with the final selection of fifty-three.

General Literature Review

Nursing represents the largest segment of the healthcare workforce (DeVillers et al., 2012; Jones et al., 2010; McGillis Hall, 2003). Therefore, nurse staffing is often at the forefront of improved efficiency and cost savings discourse. In the 1980s, in response to the economic downturn for the health care industry, the nursing profession underwent massive staffing model changes to decrease costs (Keepnews, 2013). These radical

changes gave little consideration for patient safety and quality and certainly without recognition of the impact to professional nursing.

As a historical framework, economist theory was utilized to establish goals for nursing productivity. Jones et al. (2010) describe economist theory as a "decision-making model for how people allocate scarce resources" (p. 41). The main concepts of this theory are supply, demand, and resources. An essential part of this theory is the manipulation of inputs and outputs to maximize profit (Jones et al., 2010). In its truest sense, the economist theory was utilized as a means to control production costs and improve revenue. However, this simplistic viewpoint does not readily translate to the social sciences, specifically nursing, where patient care needs are extremely diverse.

Unfortunately, in the 1990s the true costs of this limited approach became alarmingly clear with the marked increase in medical errors, adverse patient outcomes, and extensive nurse turnover (DeVillers et al., 2012; Jones et al., 2010; McGillis Hall, 2003). This knowledge created the impetus for nursing researchers to reinvestigate nursing productivity and propose new methods based on human capital and nursing intellectual theory.

Current nursing research has explored measures to define nursing work complexity in relation to patient care outcomes (Culver Clark & Allison-Jones, 2011; Graf, 2006; Jones et al., 2010; Morris et al., 2007, RWJF, 2008). It has been demonstrated that increased nurse staffing is associated with decreased length of stay, with improved patient care outcomes and with improved nurse retention (Klaus et al., 2013). This approach represents a central tenet of human capital and nursing intellectual

theories in that investment in nursing staff results in improved healthcare outcomes. However, this is contrary to current measures of productivity in that nurses are constrained by budgetary measures, rather than cultivated as a means to promote improvement in patient care outcomes.

Specific Literature Review

Productivity Formulas and Nursing

While there are multiple productivity formulas available, there is no standardized method for calculating nursing productivity. As a result, utilization of national benchmarking to define appropriate staffing levels is ineffective and at times, grossly inaccurate (Keepnews, 2013; NQF, 2012a, 2012b). Productivity definitions fall short in accurately capturing the variation in patient and nursing care activities required in current day hospital units. They have not been operationalized to measure nursing accurately in the present day context (Choi, Boyle, & Dunton, 2014; DuBois, et al., 2013; Hinno et al., 2011).

Productivity as a Cost Containment Measure

Financial Targets. "Financial challenges ranks first on the list of hospital chief executive officers' top concerns" (Goetz et al., 2011, p. 173). Nursing represents the largest percentage of the hospital health care workforce. Therefore, cost containment measures are often focused on the reduction of the nursing workforce as a strategy to control costs (Kohr et al., 2012; McHugh et al., 2013). However, this approach, while successful in the short term, has produced suboptimal long-term consequences with

reduced patient quality outcomes as the primary result. Therefore, a balanced approach to financial target attainment must be pursued (Harper, 2012).

Cost of Undelivered Care. Ball, Murrells, Rafferty, Morrow, and Griffiths (2014) found that "failure to ensure adequate nurse staffing was a central factor" in the rate of undelivered care. In a cross-national survey of 2917 RNs, 86% identified "one or more care activities was left undone due to lack of time" (Ball et al., p. 116). The inability to deliver appropriate care presents as an ethical dilemma to the professional nurse. It is considered as a form of injustice through care rationing (Ausserhofer, Schubert, Desmedt, Blegen, De Geest, & Schwendimann, 2013; Dubois et al., 2013). Further, lack of care delivery has been correlated with adverse patient care outcomes (Hinno et al., 2011).

In a study involving 2976 hospitals, McHugh et al. (2013) found that "hospitals with higher nurse staffing had 41% lower odds" (p. 1742) of being penalized for suboptimal quality performance. McKenna et al. (2011) found a similar connection, stating "reducing high nurse to patient ratios reduces stress and improves the quality of patient care provided" (p. 64). Further, in a meta-analysis of 30 studies, Myny et al. (2011) found that 87% of nurses reported that caring for too many patients resulted in undelivered care.

Therefore, the cost of undelivered care may impose an even greater cost to professional nursing. Patient care delivery represents the core of nursing and without its provision, nursing is devalued and the nurse-patient interaction further eroded.

Productivity as a Quality Control Measure

Ausserhofer et al. (2013) found that greater than 16% of hospitalized patients experienced adverse events during their inpatient stay. Productivity is a tool touted to promote RN effectiveness and efficiency. However, inadequate nursing levels not only create an environment that results in decreased effectiveness but one that results in decreased efficiencies and increased costs. McHugh et al. (2013) found that "each additional nurse hour per adjusted patient day was associated with 10 percent lower odds of being penalized" (p. 1743). Therefore, it is proposed that stringent reliance on productivity formulas may be contributing to inefficiencies in nursing, a reduction in revenue and increased healthcare costs related to nonpayment for adverse events. Interestingly, Buerhaus, Donelan, DesRoches, and Hess (2009) found that 23% of nurses surveyed identified that hospitals blamed the nursing staff for the systematic and organizational failures to adequately address patient safety.

Hospital Acquired Events. Ausserhofer et al. (2013) found an association between staffing levels and hospital acquired events, stating "between 2.9% and 16.6% of hospitalized patients are affected by adverse events" (p. 241). Kooker and Kamikawa (2010) reported similar findings in their 4-year study. They stated "dedicated resources can make a difference in outcomes for both nurses and patients" (Kooker & Kamikawa, 2010, p. 38), specifically with the reduction in pressure ulcer prevalence.

Patient Satisfaction. The ability of the professional nurse to respond to patient and family care needs drives Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) scores (Keepnews, 2013). Further, Carmenico (2011) found a

positive correlation with “RN staffing hours and patient satisfaction with the quality of discharge teaching” (p. 1).

Readmission Rates. Investment in RN staffing levels has been associated with a reduction in readmission rates with associated cost reductions (Carmenico, 2011; Choi et al., 2014). Carmenico (2011) study found that “investing in nursing care hours could potentially be offset by the savings that could be realized in readmission” (p. 2).

Productivity and Work Environment

Keepnews (2013) found that “care in hospitals with good work environments” (p. 9) promoted improved patient care outcomes. Similarly, American Hospital Association (AHA) (2013) identified that “where financial incentives are leveraged with satisfying work environments” (p. 4) the ability to create stunning patient care quality outcomes can be achieved.

Ausserhofer et al. (2013) found that “patient outcomes are related to nurse-related organizational factors concerning the work environment” (p. 242). These variables include adequate staffing levels with appropriate skill mix, as well as the availability of appropriate equipment and processes to provide excellence in nursing care.

Blegen, Donaldson, Seago, and Shapiro (2009) found that the work environment resulted in care fragmentation related to insufficient space, inadequate equipment and supplies, and system complexity. They recommended that addressing dysfunction issues in the work environment could impact on the quality and safety of patient care.

In a survey of 43,000 nurses across five countries, Carayon et al. (2008) reported that “heavy nursing workload adversely affects patient safety” (p. 203) related to limited

nursing availability. DuBois et al. (2013) found that "nurses' ability to perform is closely and consistently associated with organizational processes that define the nursing practice environment and mediate the outcomes" (p. 13). Further, Kirwan et al. (2013) reported that "practice environments are part of a causal chain linking nursing care to nurse and patient outcomes" (p. 2).

On the other hand, Kutney-Lee, Wu, Sloane, and Aiken (2013) reported "favorable staffing levels are not beneficial to patient outcomes unless the work environment is good" (p. 200). This study finding brings to light the connection between work environment and patient outcomes.

Administrative Leadership. DeBono, Heling, and Borg (2014) assert that "effective leadership styles can also have a strong impact on patient outcomes whereas an excessively strong top-down control can have a negative impact on nurses' job satisfaction" (p. 3). Research demonstrated shared administration and nurse leader partnering promotes understanding and adherence to financial and quality targets (Goetz et al., 2011; Kangasniemi et al., 2013; Lake, 2007). Further, Goetz et al. (2011) suggest that "nurses must understand their role in delivery of higher-quality care more efficiently to increase value to patients and families (p. 174).

Educational Level of Nursing Staff. Aiken et al. (2013) identify that "investments in the education of workstaff is a hallmark of high performing organizations" (p. 151). Multiple researchers found that investment in the nursing staff resulted in increased performance and improved quality outcomes (Culver Clark & Allison-Jones, 2011; Kirwan et al., 2013; & McHugh et al., 2013). However, Graf (2006)

noted that “individuals will pursue advanced education if the benefits of obtaining education outweigh the costs” (p. 3). Graf (2006) found that “for more than half of the ADN graduates, the costs of investing in advanced education outweigh the economic benefits” (p. 3). These findings suggest that organizations and staff should partner to promote educational attainment as a means to improve quality patient outcomes.

Productivity and Professional Value of the RN

Adequate staffing levels are essential to health care quality (Eschiti, & Hamilton, 2011; Keepnews, 2011; Klaus et al., 2013; NQF, 2012a; McHugh et al., 2013; McKenna et al., 2011; RWJF, 2008; Shever, 2011; Spetz et al., 2011). However, the definition of optimal RN staffing levels has not been clearly expressed. As a vehicle to explain this, hospital-based healthcare organizations often rely on national benchmarking as a means to establish appropriate staffing levels. However, as there is no singular definition of nursing productivity, the reliance on national benchmarking is flawed. Further, measuring nursing hours against the number of patients assumes that all patients and all nurses are the same, with the same needs and skill sets. Patient-to-nurse ratio represents the basis of productivity standard development. Unfortunately, this calculation degrades the human experience of the patient-nursing dynamic. Further, it totally invalidates the knowledge base and professional value of the RN by ignoring these essential elements of nursing and reducing professional nursing to a simplistic mathematical formula.

Keepnews (2013) identifies that “nursing care generates payments to hospitals” (p. 3). This view represents a paradigm shift from prior thinking of nursing as an expense. When examined in this framework, the economic value of the professional nurse is

immense. A knowledgeable and skilled nursing staff plays a significant role in overall the reduction in length of hospital stay, which is a significant driver in hospital economic viability. This dynamic is related to the professional value of the nurse to patient engagement through the provision of education, which allows the patient and family to engage in strategic healthcare behaviors at a higher level. On analysis of the length of stay alone, "reduced length of stay accounted for much greater cost savings than did increased salary costs" (Keepnews, 2013, p. 7) of augmented RN staffing levels. "However, experience shows that health care organizations do not always take the long view, particularly when threats to reimbursement are concerned" (Keepnews, 2013, p. 11).

Human Capitalist and Nursing Intellectual Theory on Nursing Productivity

Nursing intellectual theory suggests "devoting resources to the education, career development, and orientation of individuals constitutes an investment that will produce future returns for the organization" (McGillis Hall, 2003, p. 15). Educational development is particularly important in the nursing profession. It is well recognized that a highly educated nursing workforce is associated with the improved patient and staff outcomes (Culver Clark & Allison-Jones, 2011; Graf, 2006). Further, "the underlying principles of human capital are that individuals possess skills, experience and knowledge that have an economic value to the organization" (McGillis Hall, 2003, p. 15).

Literature Review Related to Method

Application of this theoretical approach to nursing productivity allows organizations to invest in their nursing workforce as a means to improve patient care

outcome, improve nurse retention and satisfaction, and, therefore, ensure their financial viability. This theoretical framework supports nursing professionalism through the development of pathways to safeguard nursing staff pursuit of continual education. Embedding evidence-based practice standards in the organization will promote improved patient care outcomes. RWJF (2008) reports that investing in nurses creates "an opportunity to improve quality of patient care – and increase their job satisfaction" (p. 12).

Summary

The literature recognizes the RN is an instrumental member of the health care team. However, current productivity measures do not accurately measure the value of skill, knowledge and expertise the RN contributes to the achievement of quality patient care outcomes. Without clear linkages between the professional value of the RN and optimal patient care outcomes, the RN cannot be effectively leveraged to achieve dynamic change in the health care arena. Therefore, the literature demonstrates a gap in defining the professional value of the RN as it specifically relates to patient care outcomes and organizational quality objectives.

Section 3: Methodology

Introduction

As previously stated, the purpose of this project is to utilize a self-administered electronic survey of RNs in an inpatient health care setting to explore the relationship between organizational productivity model and the professional value of the hospital-based RN. Organizational determinants such as staffing resources, burnout level of RN, and quality outcomes add depth to the analysis. By defining this relationship, the professional value of the RN can be measured and utilized as a means to promote excellence in patient care outcomes measures.

Increasing nurse staffing alone is not likely to improve patient care outcomes. The complexity of this professional value construct requires a sophisticated means to measure the variables that contribute to and influence health care outcomes appropriately. The project design and methods are presented to demonstrate how existing data elements can be leveraged to create a composite score designed to represent the professional value of the RN in the hospital-based setting. The population for this project was selected to gain a broad insight of the traditional hospital-based units, and the quality metrics achieved by the project site as compared with the national benchmark data.

Data Source

The data utilized in this research project were calendar year (CY) 2014 organizational productivity data, including patient volume and NCH, provided to the researcher from the finance department of the research site. Data pairing with CY2014 and nurse sensitive indicator data received from the quality department was completed.

Data were then analyzed utilizing national benchmark data in comparison with organizational data. Unit specific composite scores were calculated based on performance achievements. Finally, demographic information and data specific to RN emotional exhaustion and practice environment was obtained from a self-administered survey. This complex formula blended organizational and personal factors with quality outcomes and created a mathematical result to compare against a national data using the same methodology.

Project Design/Methods

The descriptive correlational design allows for further understanding of "the phenomena being investigated" (Terry, 2012, p 24). For this project, the design allows for exploration of productivity formulas about the value of the professional nurse as identified using reliable and validated instruments (MBI and PES-NWI) and the resultant relationship with patient care outcomes. An electronic survey with nursing staff was utilized to understand the key regarding burnout and the nursing environment. Further, nurse staffing and patient census financial reports were analyzed using the PVS as the basis for analysis of the proposed intervention. This approach will result in the construction of an innovative process to redefine nursing productivity as a component of the professional value of the RN as measured by patient care outcomes.

The project framework achieves objectives by demonstrating conceptual linkages between productivity, patient safety and quality care outcomes. Stringent reliance on HPPD and MN productivity measures is a process that inhibits the quantification of the value of the professional nurse. This linkage can be demonstrated through lack of

organizational investment in the nursing and the nurse practice environment and utilized as a measure to demonstrate organizational recognition of the professional value of the nurse. Suboptimal management of the professional nursing environment results in nursing burnout that ultimately is demonstrated through suboptimal patient care outcomes.

The descriptive correlational design was an ideal methodology for this project. Correlation allowed for exploration of variables as a means to provide conceptual clarity. The constructs of burnout and nurse practice environment were analyzed in light of organizational productivity standards. This approached allowed for exploration of the professional value of the bedside nurse in the research site. Quantitative data explored organizational productivity targets against nationally accepted benchmarks of NCH, patient falls, HAPU, and CAUTI. Further, quantitative data regarding burnout and nurse practice environment were established utilizing widely reliable and validated instruments to explore the professional value the RN brings to the healthcare environment.

A definitive measurement of the professional value of the nurse is required to provide greater understanding of the factors that influence nursing's ability to promote patient outcomes. The purpose of this project was to transform current productivity measurements to a professional value model to enable measurement of this concept. Drake, Luna, Georges, and Barker Steege (2012) identify that "nurse wellness is a foundational element for sustenance of professional nursing practice" (p. 307). Aiken et al. (2013) asserted that "how well nurses are faring in hospitals in the current context of cost containment is a barometer of how well patients are faring" (p. 144). Further,

Dubois, et al (2013) identify that “no system for healthcare delivery can fulfill its objective of providing care and improving health without deploying the necessary human and material resources” (p. 7).

The MBI-EE is “one of the most widely used measuring instruments for assessing the construct of burnout” (Aguayo, Vargas, de la Fuente, & Lozano, 2011, p. 343). The MBI-EE was used as a component of the NC to measure NCHs necessary to achieve organizational quality targets. This instrument is ideal for this research protocol. Dubois, et al. (2013) found “pushing staff to deliver an unreasonable number of targets may increase stress, lower morale and ultimately compromise quality” (p. 116).

The MBI-EE subscale, an 8 question 7-point Likert scale, was utilized in a self-administered tool to explore burnout level of the survey participants. This subscale was comprised of MBI questions 1, 2, 3, 6, 8, 13, 14 and 20 (Pisanti et al., 2012). All questions from MBI-EE were utilized; there were no changes to the MBI-EE instrument questions for the purpose of this research protocol. MBI-EE measured the level of burnout experienced by the RN staff. Then, I analyzed burnout through the NC score. NC result was compared with national benchmark data. The individual mean score, as well as mean unit score, was calculated for the MBI-EE subscale.

A second component of the NC is in the realm of the work environment. Aiken et al. (2013) identified that “strains in the nurse workforce possibly result from inadequate staffing and resources” (p. 152). Further, Ausserhofer et al. (2013) identified that “high numbers of adverse events are related to organizational factors, such as heavy workloads” (p. 241). Additionally, Ausserhofer et al. (2013) found that “patient outcomes are related

to nurse related organizational factors concerning the work environment (p. 242). Therefore, a means to measure the impact of the nurse practice environment on the RN supports delivery of quality patient outcomes.

To add richness to the NC construct, I used the Nursing Foundations for Quality Care (Q) and Staffing and Resource Adequacy (S) subscales of the PES-NWI. This 13 question, 4-point Likert scale instrument, deployed in a self-administered survey format, explored participant experience in their practice environment. The PES-NWI/Q subscale included questions 4, 14, 18, 19, 22, 25, 26, 29, 30 and 31 in the original presentation (Lake, 2007). The PES-NWI/S subscale represented questions 1, 8, 9, and 12 from the PES-NWI and was also included as originally presented (Lake, 2007). Individual mean scores, as well as mean unit scores, were calculated for each of the subscales.

The QC score, developed by the researcher, allowed for mathematical exploration of the various components of patient outcomes related to the practice environment experienced by the nurse. This QC was calculated utilizing the following formula: $Fall_{unit}$ + $HAPU_{unit}$ + $CAUTI_{unit}$:$Falls_{natl}$ + $HAPU_{natl}$ + $CAUTI_{natl}$. The QC score allowed for analysis of unit performance to nationally accepted benchmarks and provided the definitive measurement for performance improvement.

The NC score, developed by the researcher, likewise allowed mathematical analysis to explore the elements of nurse productivity to nurse burnout and the practice environment as experienced by the nurse. This composite score was calculated utilizing the following formula: NCH_{unit} + $MBI\text{-}EE_{unit}$ + $PES\text{-}NWI/Q_{unit}$ + $PES\text{-}NWI/S_{unit}$:NCH_{natl} + $MBI\text{-}EE_{natl}$ + $PES\text{-}NWI/Q_{natl}$ + $PES\text{-}NWI/S_{natl}$.

The PVS was then calculated as the result of the NC and QC scores and compared to national PVS which resulted in the Professional Value Ratio (PVR). The PVR formula numerically represents the professional value of the nurse in the healthcare arena. The PVR provides administrators with a more robust tool to analyze the efficiency and productivity of the hospital-based RN with organizational goals of quality patient outcomes.

In summary, the project intervention re-analyzed existing productivity data through the lens of NCH, PES-NWI/Q, PES-NWI/S, and MBI-EE, and identified nurse sensitive indicators to measure appropriate nurse staffing levels needed to achieve organizationally defined patient outcome objectives. The multivariable richness of the PVS could guide informed dialog regarding nurse staffing and the professional practice environment, as a means to improve patient care outcomes. The professional value model gives administrators a tool to fully evaluate their organizational practice environments and manipulate key variables to allow for improved patient care outcomes, and improved nurse environments while meeting organizational financial targets.

Population and Sampling

Population inclusion criteria for the project include the hospital-based RN currently working 50% or more of the time as a bedside nurse in the following units of the research site: medical, surgical, PCU, and CCU. Exclusion criteria include RNs working less than 50% of the time as a bedside nurse, lack of current RN license, not currently working on the identified units, and age greater than 65 years.

A descriptive correlational study design utilized convenience sample technique to control bias risk and maintain a "high degree of representativeness" (Terry, 2012, p. 68). I performed convenience sampling of RNs of the identified hospital-based nursing units who met above-defined inclusion criteria. A minimum sample size of 35 was desired. Participation in the study was voluntary; however, to obtain adequate sampling size engagement strategies were employed (see Appendix A). Electronic reminder notification to study participation occurred seven days after survey period opened. Survey participation opportunity remained open for ten days. An electronic closure letter announced the survey period.

Data Collection

Instrument

A self-administered electronic survey format utilizing Survey Monkey software was used. Demographic data included overall years as an RN, current unit, shift, years as an RN on current unit, highest nursing degree obtained, and full-time equivalent (FTE) status. The instruments used are the previously mentioned subscales of the PES-NWI and MBI (see Appendix B). Because of the complexity of the nursing profession, adequate instrumentation was essential to explore the full dynamic of the professional value in relation to productivity. Therefore, a composite score from the instruments was utilized to facilitate clarity of the relationship between the static productivity measurements and the professional value construct.

Protection of Human Subjects

The risk to the study participants is minimal. I designed the study as an electronic survey with voluntary participation to assure anonymity and avoid undue stress to study participants. Project design represented a minimal risk, and Protection of Human Subject standards do not require Institutional Review Board (IRB) process. However, expedited review through the both IRBs at Walden University (07-29-15-0385374) and the research site were obtained.

Subjects were identified utilizing human resource cost center and job code data, and recruited through electronic notification via research site email system, utilizing established distribution listings of RNs working on defined units. The initial electronic introductory letter included a disclaimer with a description of informed consent for voluntary participation, as well as a description of the project (see Appendix C). No additional protections were required specific to vulnerable populations due to the defined inclusion/exclusion study criteria of the study.

Potential benefits are the improvement in the work environment and professional value of the hospital-based RN. Additionally, improved patient care quality outcomes, related to the adoption of new evidence-based professional value productivity formula as a means to provide adequate direct care RN staffing at the bedside could result.

Important knowledge gained was the application of evidence-based productivity formula in a hospital-based setting, with recognition of the professional value of the bedside RN to patient quality and nurse-patient dynamic. I converted the current hospital productivity model, patient days based on MC divided by total staffing hours, to the

professional value model calculated with PDAH divided by NCH. This approach allowed for intense analysis of the hours available to provide direct patient care and thus provides clarity on the impact of quality outcomes.

Two subscales of the PES-NWI instrument were utilized to deepen the professional value model analysis. This approach allowed for robust understanding of elements in the practice arena that influence or deter nursing's ability to perform optimally. This multifactorial approach allowed for focused analysis on the work of the professional staff with the provision of patient care and resultant quality outcomes. As such, it provided a more meaningful analysis of nurse staffing to determine accurate adjustments to staffing for the identified unit. Through clear demonstration of this relation between nurse productivity formulas and patient safety and quality, I defined and measured the professional value of the hospital-based nurse.

Data Analysis

Reliability and Validity

The MBI-EE subscale is a widely utilized instrument in the healthcare literature. Reliability and validity of this tool in the evaluation of nursing burnout construct are consistently demonstrated (Aguayo et al., 2011; Pisanti et al., 2012). For the purpose of this project, the MBI-EE subscale was utilized as the instrument to explore the burnout construct of the study participants as related to nursing productivity and practice environment.

This project used the Foundation of Quality Care (PES-NWI/Q) and Staffing Resource Adequate (PES-NWI/S) subscales. High reliability and validity of these

instruments to explore the practice environment of the nurse is established (Parker, Tuckett, Eley, & Hegney, 2012). Further, NQF (2012a) states "the evidence from the literature supports the psychometric rigor of the instrument and suggests that nurses' practice environment are part of a causal chain linking nursing care to nurse and patient outcomes" (p. 1).

Analytical Techniques

Descriptive statistical analysis was utilized as a means to establish a correlation between productivity factor and the PVS composite. Univariate and bivariate analysis were employed to examine the relationships between the variables. Mean scores were calculated to provide a description of the study participants, specifically with years in nursing and years on current unit, and educational attainment. Further, analysis of variance (ANOVA) and multivariate analysis of variance (MANOVA) testing were utilized to explore group means and variability between groups.

Finally, inferential statistics was utilized as a means to test the defined hypothesis and draw conclusions based on the study framework and statistical analysis. Pearson's correlation coefficient was utilized to determine the relationship between identified variables.

Project Evaluation Plan

Formative evaluation was the framework for the evaluation plan of this project. As the construct of professional value is immature, additional clarity was necessary. Through the study framework and data analysis, evaluation activities are instrumental in

defining solutions and identifying questions for future research specific to the professional value construct.

Summary

The complexity of care delivery by the professional nurse cannot be demonstrated as a single variable, namely productivity. Therefore, as a means to explore the value of the professional nurse in patient quality and safety, a complex and thorough analysis was undertaken as a means to define the professional value of the hospital-based RN. The study sought to provide a clear definition and mechanism to measure the professional value of the nurse. A clear definition will propel the healthcare industry in the achievement of patient care excellence in quality and safety while maintaining appropriate financial efficiencies and cost containment strategies.

Discussion

The value of the hospital-based professional nurse to patient care outcomes is well known but has never been fully measured. Inconsistent definitions and lack of standardized mechanism to accurately quantify the value of nursing interventions, skill and knowledge to optimal patient care outcomes were identified as barriers. This project was proposed to provide a consistent, standardized tool to measure and quantify the importance of nursing care as it relates to patient care outcomes in this dynamic healthcare system climate.

Section 4: Findings, Discussion, and Implications

Introduction

The survey respondents were described utilizing summary statistical analysis (means, standard deviations and percentages). Descriptive statistical analysis techniques were utilized to describe the relationship between patient care quality metrics and nursing burnout in comparison with current and PVS models to understand nursing productivity. I describe the relationship between the variables using various statistical tests in detail below.

The data were defined utilizing a consistent measure of actual to target to allow for direct analysis of the multiple variables. Specifically, variables were analyzed against the attainment of the target for the current productivity measure utilizing the MC methodology and the PVS model utilizing the PDAH methodology.

Findings and Discussion

RNs on the medical, surgical, PCU, and CCU of the research site, who met inclusion criteria, received the self-administered electronic survey (N =102), with a 47.1% participation rate. Of these respondents, two elected to "opt out" of the survey. As a result, the sample consisted of forty-eight RNs. Utilizing statistical software (SPSS, Version 21), each data variable was screened and cleaned of errors utilizing the descriptive statistic frequency. Minimum and maximum were utilized as evaluate tools to ensure accuracy in data entry. All data entry errors were corrected before further analysis of the data elements was undertaken.

Sample Characteristics

The educational accomplishment of the RN respondents revealed that no survey participants had a master's or higher degree, with the educational level of the majority of respondents at the associate degree level (68.1%, *n*=32). The majority of respondents worked 65 to 80 hours per pay period (77.1%, *n*=37). Nursing experience frequency analysis revealed years as RN ranged from 0.5 to 40 years, with 6 years representing the highest frequency (5, 10.4%), and years on current unit ranging from 0.1 to 34 years, with 1.5 years representing the highest frequency (7, 14.6%). Shift assignment of respondents revealed 58.3% (*n*=28) work a 12-hour-day shift, and the remainder of respondents (41.7%, *n*=20), working a 12-hour-night shift. Specific to nursing unit representation, PCU had the highest response rate (39.6%, *n*=19) and CCU the lowest (12.5%, *n*=6); (see Appendix D).

Profile by Unit

As the demographic data utilized different scales, a conversion was necessary for comparison. Descriptive statistical analysis was undertaking using *z*-scores technique at the unit level to develop greater understanding of the unit profile of the RN respondents. Variables analyzed included years on current unit, years as RN, MBI-EE, PES-NWI/S, PES-NWI/Q, Current Productivity, PVS, and PVR. The *z*-scores from each of the variables were computed utilizing statistical software (SPSS, Version 21).

Medical unit data reveal Years as RN raw score of 8.53 with a *z*-score of -1.23, and Years on Current Unit 4.96, *z*=-1.24, with PES-NWI/S 2.63, *z*=-1.50, PES-NWI/Q 3.2, *z*=1.46, MBI-EE 2.76, *z*=.871, PVS 1.77, *z*=-1.00, and PVR .45, *z*=-.882. Surgical

reveals Years on Current Unit 11.58, *z*=1.41, with PVS 4.63, *z*=.74, and PVR 1.15, *z*=1.28, and MBI-EE 2.50, *z*=-.674. For the CCU, Years as RN 17.91, *z*=1.13, and Productivity is 1.07, *z*=1.28, MBI-EE is 2.44, *z*=-1.04 are more than one standard deviation above the mean, whereas, on PCU, all identified variables analyzed by *z*-score are less than one standard deviation below the mean.

The *z*-score analysis of the unit variables indicates the Medical nursing staff has lower mean scores on PES-NWI/S, PVS, and PVR. While the respondents identified with the delivery of quality patient care, they are experiencing increased stress and lack of identified staffing support. This finding may be indicative of the level of nursing proficiency, efficiency, and knowledge development. However, these findings indicate an opportunity to evaluate the staffing plan to support the staff at their current level of knowledge and expertise as a mechanism to improve patient care outcomes. Conversely, Surgical demonstrated PVR more than one standard deviation above the mean, with stress levels nearly one standard deviation below the mean. This result may indicate staffing stability serves to decrease stress and promote a sense of professional value amongst the nursing staff on the unit.

Correlations

Current shift and Calculated nurse composite scores had a moderately strong, significant correlation (*r*= .606, *p*=.0.05). Moderately strong positive correlations, significant at the *p*=<0.01 level (two-tailed) include Current Unit and PVS, Unit; Current Unit and PVS, Individual; and Current Unit and Calculated QC. However, PVS, Unit, and PVS, Individual showed a strong inverse relationship, at the *p*=<0.01 level (two-

tailed) with Calculated QC. This analysis indicates that as PVS increases, achievement of the quality target also improves, as a lower QC mean represents improvement toward benchmark achievement. Moderately strong negative correlation is seen with respect to Calculated NC and Calculated QC, significant at the $p<0.01$ level. This analysis also indicates a relationship between the two variables, and as the NC improves, there is a reduction in the QC, which indicates trending towards the achievement of national quality benchmark expectations. (see Table 3).

Independent T Test

Independent sample *t* test was conducted to compare the current productivity within 90% of target for the variables PES-NWI/Q Unit, NC Ratio, QC Ratio, MBI-EE Individual, MBI-EE Unit, PVS Individual and PVS Unit.

Independent sample *t* test was conducted utilizing QC achievement of 90% of national benchmark target. The data demonstrated statistical differences in the mean score of PES-NWI/S, Unit (M=2.66, SD=.040) with the achievement of the QC; $t(36)$=-9.78, p=<0.05. MBI-EE Unit mean score with the achievement of the QC demonstrates (M=2.90, SD=.000) versus non-achievement (M=3.05, SD=.180) of this metric; $t(36)$=-5.21, p=<0.05. However, achievement of the QC shows statistical difference in the mean scores in relation to PES-NWI/Q, Unit Mean (M=3.19, SD=.000); $t(36)5.849$, p=<0.05. In analyzing the current productivity formula with non-achievement of QC, a statistical difference was demonstrated in the mean scores (M=.9809, SD=0.543); $t(36)$=-5.812, p=<0.05.

Table 3

Correlation of key variables utilizing bivariate analysis

		Calculated NC	Calculated QC	Professional Value Score, Unit	Professional Value Score, Individual	Current Shift
Calculated NC	Pearson Correlation	1	-.363*	.560**	.601**	-.249
	Sig. (2-tailed)		.011	.000	.000	.087
	Sum of Squares and Cross-products	304.971	-93.414	88.195	94.802	-14.877
	Covariance	6.489	-1.988	1.876	2.017	-.317
	N	48	48	48	48	48
Calculated QC	Pearson Correlation	-.363*	1	-.950**	-.944**	.259
	Sig. (2-tailed)	.011		.000	.000	.076
	Sum of Squares and Cross-products	-93.414	216.588	-126.165	-125.556	13.018
	Covariance	-1.988	4.608	-2.684	-2.671	.277
	N	48	48	48	48	48
Professional Value Score, Unit	Pearson Correlation	.560**	-.950**	1	.992**	-.205
	Sig. (2-tailed)	.000	.000		.000	.161
	Sum of Squares and Cross-products	88.195	-126.165	81.448	80.884	-6.332
	Covariance	1.876	-2.684	1.733	1.721	-.135
	N	48	48	48	48	48
Professional Value Score, Individual	Pearson Correlation	.601**	-.944**	.992**	1	-.258
	Sig. (2-tailed)	.000	.000	.000		.077
	Sum of Squares and Cross-products	94.802	-125.556	80.884	81.645	-7.959
	Covariance	2.017	-2.671	1.721	1.737	-.169
	N	48	48	48	48	48
Current Shift	Pearson Correlation	-.249	.259	-.205	-.258	1
	Sig. (2-tailed)	.087	.076	.161	.077	
	Sum of Squares and Cross-products	-14.877	13.018	-6.332	-7.959	11.667
	Covariance	-.317	.277	-.135	-.169	.248
	N	48	48	48	48	48

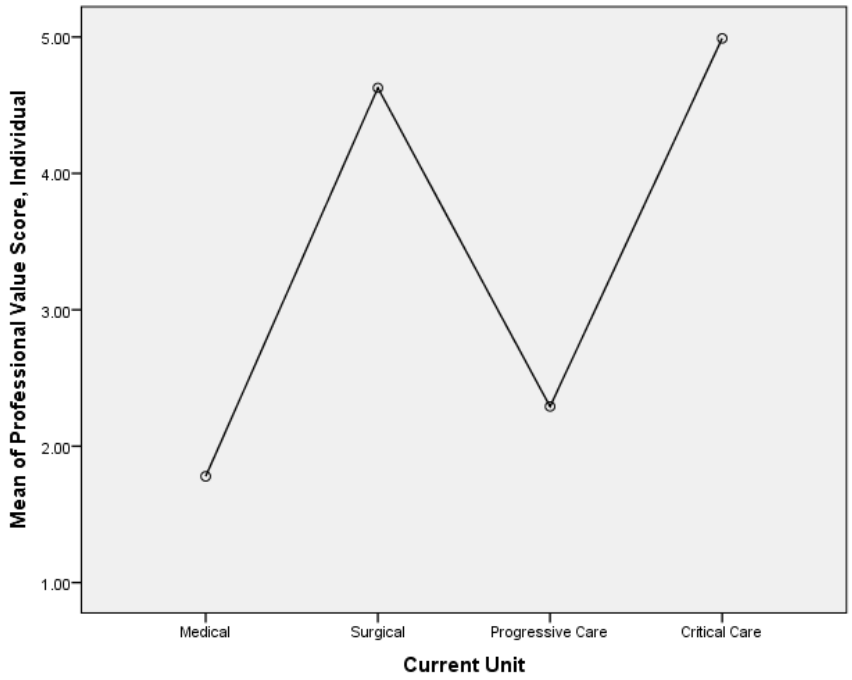
*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

This analysis suggests that survey participants who experience higher levels of emotional exhaustion are less able to achieve quality in patient outcomes as measured by the QC. This result also demonstrates the reduced professional value of the RN to the organization. Further, with the achievement of the QC, statistical differences are identified in the mean scores of PES-NWI/S and PES-NWI/Q.

Analysis of Variance

A one-way between-group ANOVA was conducted to explore the impact of Current Unit on PVS. Participants were divided into four groups according to their Current Unit (Group 1: Medical, Group 2: Surgical, Group 3: PCU; Group 4: CCU). There was a statistically significant difference at the $p<0.05$ level in PVS in the four units, $F(3, 44)=853.78$, $p=.014$. The actual difference between means scores of the units was substantial. The effect score, calculated using eta squared was .98. Post hoc comparison using the Tukey HSD indicated that the mean score for Group 1: Medical ($M=1.77$, $SD=.137$) was significantly different from Group 2: Surgical ($M=4.62$, $SD=.261$) and Group 4: CCU ($M=4.99$, $SD=.236$), with the means of these two Groups more than twice the Group 1 mean. There is also a statistical difference between Group 1 and Group 3 ($M=2.29$, $SD=.107$), but not as great a shift when compared with Group 2 and Group 4 results (see Figure 1). These results indicate the RN staff in the medical unit experience less professional value than their counterparts on the surgical unit. An additional statistical exploration into unit differences was undertaken to define this statistically significant difference further.

Figure 1. Professional Value Score, by Unit.



A one-way between-group ANOVA was also conducted to explore the impact of Current Unit on PES Quality, Individual. Participants were again divided into four groups according to their Current Unit (Group 1: Medical, Group 2: Surgical, Group 3: PCU; Group 4: CCU). There was a statistically significant difference at the $p<0.05$ level in PES Quality, Individual for the four units, $F(3, 44)=4.354$, $p=.009$. Again, the difference between means scores of the units was noted; however, the effect score, .22, calculated using eta squared, was small. Post hoc comparison using the Tukey HSD indicated that the mean score for Group 3: PCU ($M=2.92$, $SD=.116$) was significantly different from Group 1: Medical ($M=3.30$, $SD=.337$). Group 1 or 3 did not differ significantly from either Group 2 or Group 4 (see Table 4).

A one-way between-group ANOVA was conducted to explore the impact of stress based on achievement of productivity model, as measured by MBI-EE. Four distinct groups were evaluated in this analysis (Group 1: Neither model, Group 2: Current model, Group 3: PVS model and Group 4: Both models. MBI-EE demonstrated no statistical difference between groups. However, MBI-EE mean was higher for Group 1 (M=3.34, SD=1.74) and Group 2 (M=3.13, SD=.95, as compared to Group 3 (M=2.85, SD=1.26), indicating participants experience higher levels of stress when unable to achieve productivity expectations. Achievement of Group 4 was not demonstrated by any unit (see Figure 2).

A one-way between-group ANOVA was performed to explore the impact of staff perception of quality based on achievement of productivity model, as measured by PES-NWI/Q, utilizing the same groups as noted above. There was a statistically significant difference at the p<0.05 level in the PES-NWI/Q mean scores for the four productivity groups, $F(2, 45) = 6.57$, p=.003. The actual difference in means scores between the groups was large. The effect size, calculated utilizing eta squared, was .77. Post-hoc comparisons using the Tukey HSD test indicated that the mean score for Group 1 (M=3.301, SD=.337) was significantly different than the mean score for Group 2 (M=2.94, SD=.187). Group 3 (M=3.17, SD=.438) did not differ significantly from either Group 1 or Group 2. Further, it was noted that when productivity utilizing the current standard is achieved, the participant perception of quality care is reduced, compared to Group 1 and Group 3. (see Figure 3). Although more analysis may need to be undertaken, this indicated that due to productivity restrictions related to time and staff availability, RNs perceive the quality of

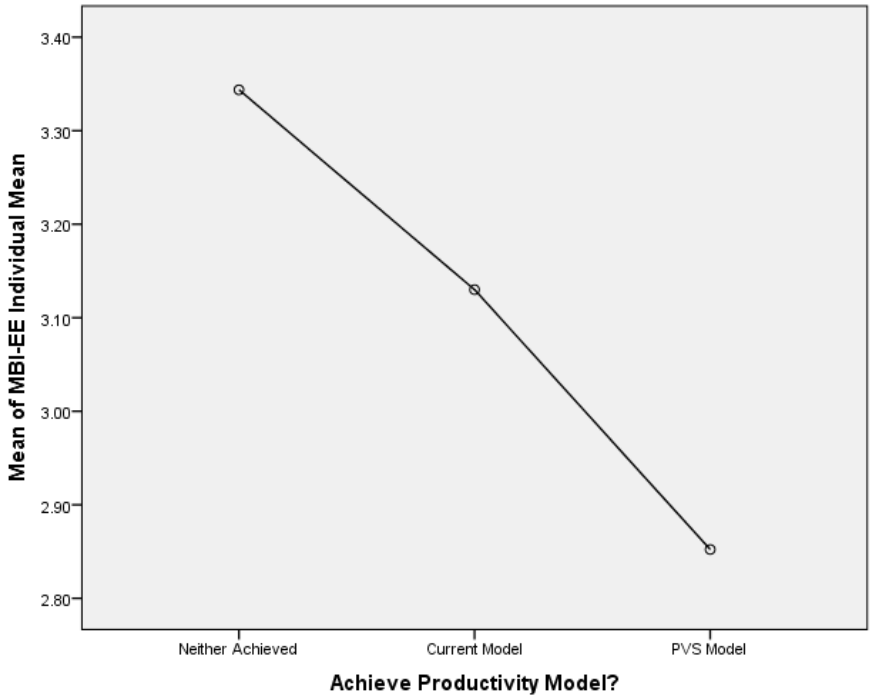
Table 4

One-way ANOVA of PVS and PES-NWI/Q, Individual, by Unit

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Professional Value Score, Individual	1.00 Medical	2.00 Surgical	-2.84807*	.07389	.000	-3.0454	-2.6508
		3.00 PCU	-.51209*	.06527	.000	-.6864	-.3378
		4.00 CCU	-3.21134*	.08851	.000	-3.4477	-2.9750
	2.00 Surgical	1.00 Medical	2.84807*	.07389	.000	2.6508	3.0454
		3.00 PCU	2.33597*	.06707	.000	2.1569	2.5150
		4.00 CCU	-.36328*	.08984	.001	-.6032	-.1234
	3.00 PCU	1.00 Medical	.51209*	.06527	.000	.3378	.6864
		2.00 Surgical	-2.33597*	.06707	.000	-2.5150	-2.1569
		4.00 CCU	-2.69925*	.08290	.000	-2.9206	-2.4779
	4.00 CCU	1.00 Medical	3.21134*	.08851	.000	2.9750	3.4477
		2.00 Surgical	.36328*	.08984	.001	.1234	.6032
		3.00 PCU	2.69925*	.08290	.000	2.4779	2.9206
PES Quality Individual	1.00 Medical	2.00 Surgical	.12894	.12591	.736	-.2072	.4651
		3.00 PCU	.37535*	.11122	.008	.0784	.6723
		4.00 CCU	.31833	.15082	.166	-.0844	.7210
	2.00 Surgical	1.00 Medical	-.12894	.12591	.736	-.4651	.2072
		3.00 PCU	.24641	.11428	.152	-.0587	.5515
		4.00 CCU	.18939	.15309	.607	-.2193	.5981
	3.00 PCU	1.00 Medical	-.37535*	.11122	.008	-.6723	-.0784
		2.00 Surgical	-.24641	.11428	.152	-.5515	.0587
		4.00 CCU	-.05702	.14125	.977	-.4342	.3201
	4.00 CCU	1.00 Medical	-.31833	.15082	.166	-.7210	.0844
		2.00 Surgical	-.18939	.15309	.607	-.5981	.2193
		3.00 PCU	.05702	.14125	.977	-.3201	.4342

*. The mean difference is significant at the 0.05 level.

Figure 2. Achievement of Model, by Type, measured by Maslach Burnout Inventory, Emotional Exhaustion subscale.



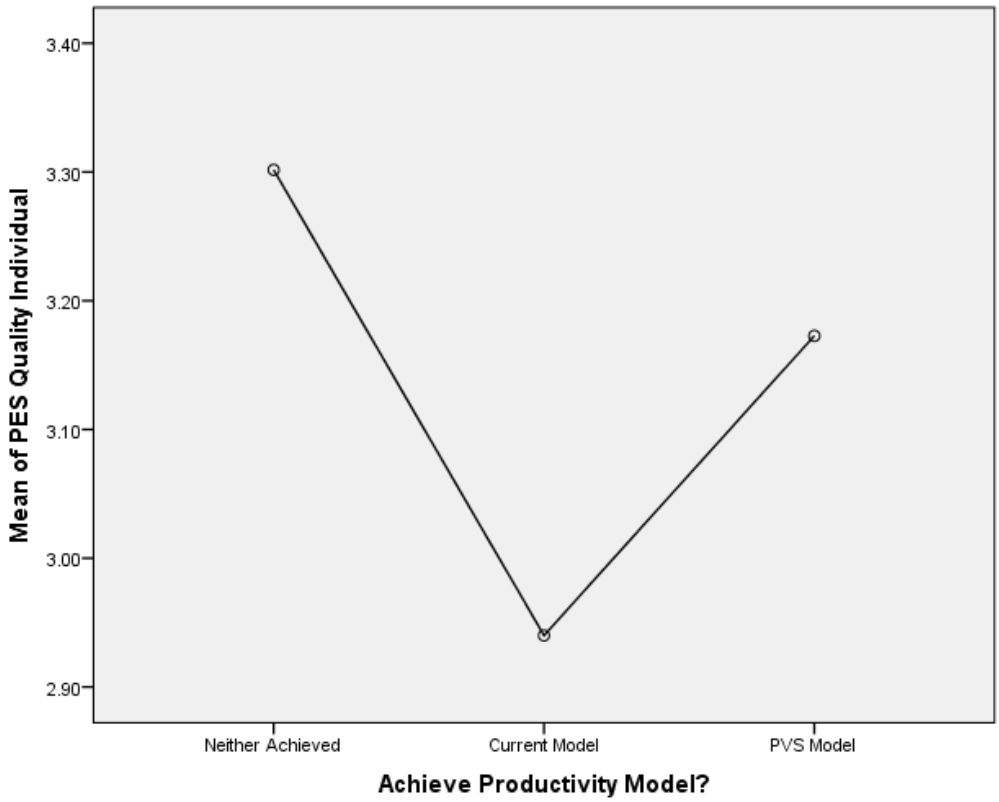
care delivery is compromised. However, the perception of quality care delivery is elevated in both the PVS model and when neither model of productivity was achieved.

This result indicated that when perceived rigid restriction was placed on RN time, the perception of quality was reduced.

I performed a deeper analysis of instrumentation to develop a greater understanding of the survey results. I performed separate result analysis for statistically significant question responses for MBI-EE, PES-NWI/S, and PES-NWI/Q.

A one-way between-group ANOVA was undertaken to evaluate the impact of staff stress, as measured by the Emotional Exhaustion subscale of the MBI, and categorized by the unit. Levene's test for homogeneity of variance demonstrated no violation of assumption on two questions, Question 3, Fatigue and Question 20, End of Job. However, statistical

Figure 3. Perception of Quality Care delivered as measured by productivity model



difference at the $p<0.05$ level was not demonstrated between any of the four units (Group 1, Medical; Group 2, Surgical; Group 3, PCU; Group 4, CCU) on the MBI-EE Question 3 or Question 20. Additionally, the effect size, calculated utilizing eta squared, was small for both Question 3 and Question 20. Post-hoc comparisons using the Tukey HSD test indicated that the mean score for Group 2 was lowest on Question 3 and highest for Question 20. When levels of stress, as measured by MBI-EE exceed the national benchmark, an increased sense of fatigue is experienced by survey respondents. This phenomenon occurred across all four units, but most notably in Group 1 and Group 4. (see Figures 4 and 5).

Figure 4. MBI-EE Question 3 mean analysis, by unit, as measured by achievement of MBI-EE national benchmark.

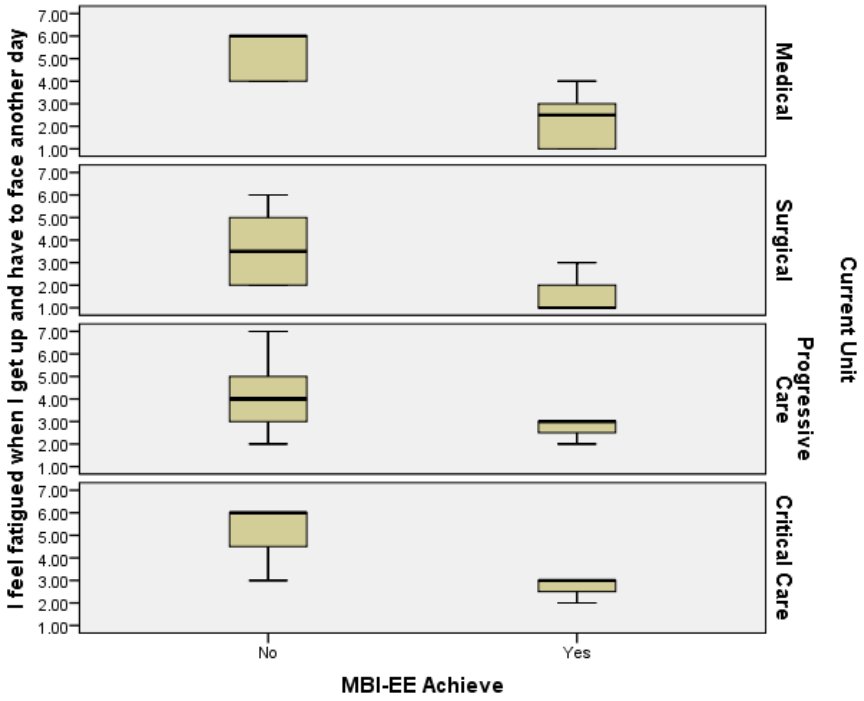
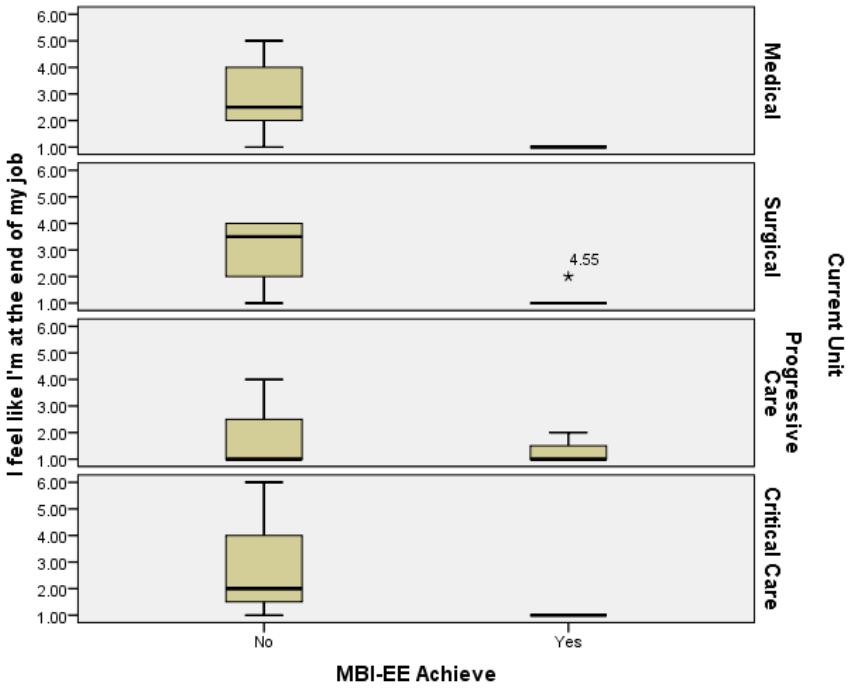


Figure 5. MBI-EE Question 20 mean analysis, by unit, as measured by achievement of MBI-EE national benchmark.



I conducted one-way between-group ANOVA to explore the impact of staff perception of staffing and resources, as measured utilizing PES-NWI/S. Levene's test for homogeneity of variance demonstrated no violation of assumption on three questions, Question 1, Adequate Support, Question 9 Adequate RNs and Question 12, Enough Staff. However, again, no statistical difference ($p<0.05$) was demonstrated between any of the four units (Group 1, Medical; Group 2, Surgical; Group 3, PCU, Group 4, CCU) on PES-NWI/S subscale Questions 1, 9, or 12. Additionally, the effect size, calculated utilizing eta squared was small for all three questions. Post-hoc comparisons using the Tukey HSD test indicated similar mean scores between the four units (see Table 5).

I explored the impact of highest nursing degree on stress level, and staff perception of staffing resource adequacy and quality care delivery, using one-way between-group ANOVA. I measured MBI-EE, PES-NWI/S, and PES-NWI/Q separately. There were no statistically significant differences at the $p<0.05$ level demonstrated for any of the three variables based on highest nursing degree attained. However, post-hoc comparisons using the Tukey HSD test indicated that the mean score for Group 1, ADN related to stress was lower than reported by Group 2, BSN, indicating ADN trained RNs experienced lower levels of stress (see Figure 6). Post-hoc comparison also revealed this disparate finding in relation to perception of staffing and resource adequacy between Groups 1 and 2 (see Figure 7) and perception of quality care delivery (Group 1 ($M=3.10$, SD=.36); Group 2 ($M=3.04$, SD=.26)) (see Figure 8).

The significance of these findings needs detailed exploration. However, the findings indicate that the expectations of RNs with higher nursing degrees are elevated

Table 5

PES-NWI/S, Question Analysis

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
PES Staffing Resource Individual	1.00 Medical	12	2.5833	.50377	.14543	2.2633	2.9034	1.75	3.50
	2.00 Surgical	11	2.6364	.50452	.15212	2.2974	2.9753	1.75	3.25
	3.00 PCU	19	2.6316	.38522	.08837	2.4459	2.8172	2.00	3.25
	4.00 CCU	6	2.7500	.27386	.11180	2.4626	3.0374	2.50	3.00
	Total	48	2.6354	.42514	.06136	2.5120	2.7589	1.75	3.50
PES Staffing and Resource, Unit Mean	1.00 Medical	12	2.6300	.00000	.00000	2.6300	2.6300	2.63	2.63
	2.00 Surgical	11	2.6000	.00000	.00000	2.6000	2.6000	2.60	2.60
	3.00 PCU	19	2.6600	.00000	.00000	2.6600	2.6600	2.66	2.66
	4.00 CCU	6	2.7500	0.00000	0.00000	2.7500	2.7500	2.75	2.75
	Total	48	2.6500	.04477	.00646	2.6370	2.6630	2.60	2.75
PES Quality Individual	1.00 Medical	12	3.3017	.33796	.09756	3.0869	3.5164	2.90	4.00
	2.00 Surgical	11	3.1727	.43839	.13218	2.8782	3.4672	2.60	3.90
	3.00 PCU	19	2.9263	.20505	.04704	2.8275	3.0251	2.50	3.30
	4.00 CCU	6	2.9833	.11690	.04773	2.8606	3.1060	2.90	3.20
	Total	48	3.0838	.33236	.04797	2.9872	3.1803	2.50	4.00
PES Quality Unit Mean	1.00 Medical	12	3.2600	.00000	.00000	3.2600	3.2600	3.26	3.26
	2.00 Surgical	11	3.1900	.00000	.00000	3.1900	3.1900	3.19	3.19
	3.00 PCU	19	2.9200	.00000	.00000	2.9200	2.9200	2.92	2.92
	4.00 CCU	6	2.9800	0.00000	0.00000	2.9800	2.9800	2.98	2.98
	Total	48	3.0744	.15066	.02175	3.0306	3.1181	2.92	3.26

when compared to ADN level RNs, which may result in increased experience of stress with the inability to meet these standards. However, further exploration into the meaning of these findings is needed to fully understand their potential significance.

Finally, a one-way between-group ANOVA was run to explore the impact of staff perception of quality care delivery, as measured by PES-NWI/Q. There was a statistically

Figure 6. Stress perception by highest nursing degree attained as measured by MBI-EE.

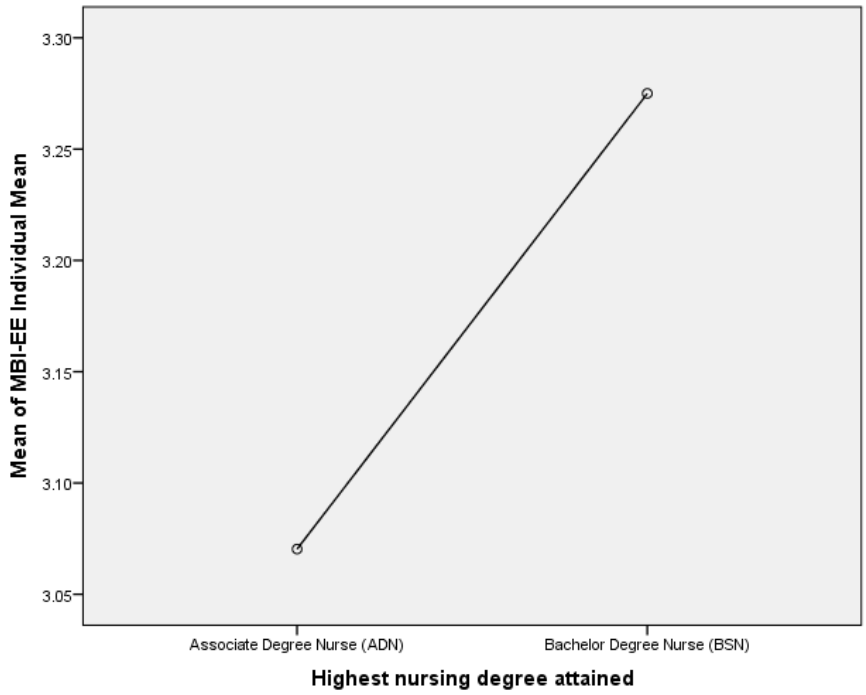


Figure 7. Staffing and resource adequacy perception by highest nursing degree attained as measured by PES-NWI/S.

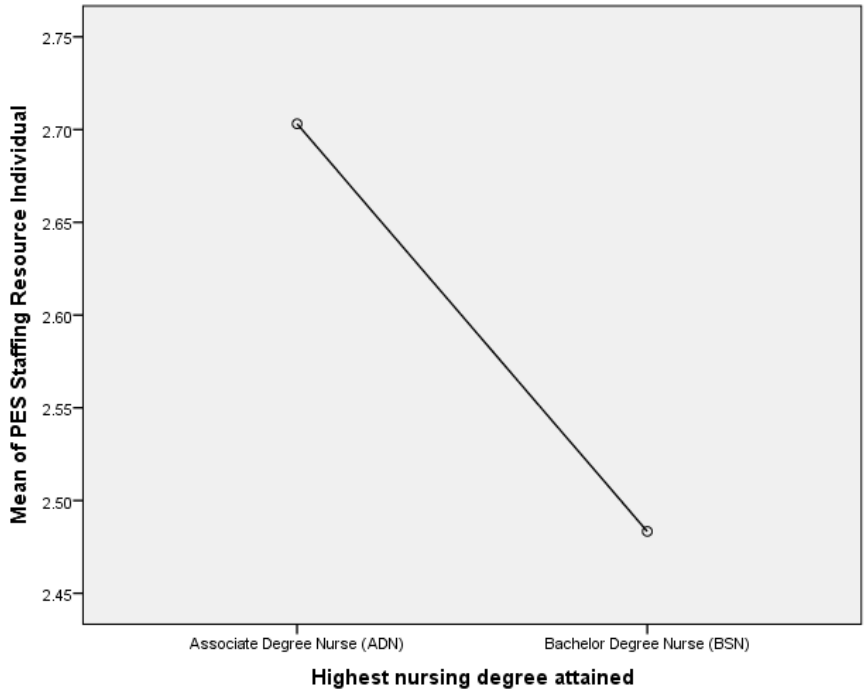
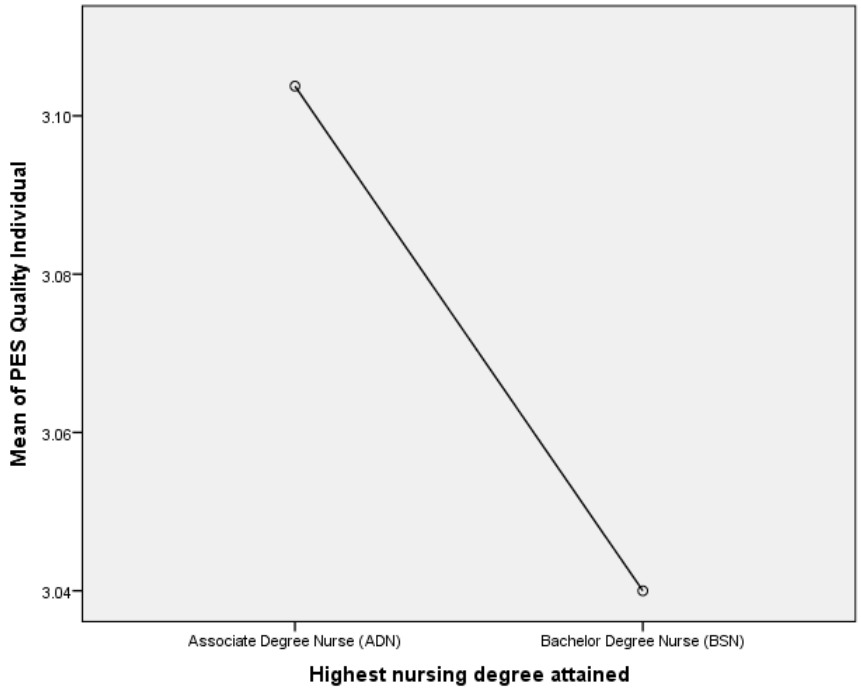


Figure 8. Quality care delivery perception by highest nursing degree attained, as measured by PES-NWI/Q.



significant difference at the $p<0.05$ level for three questions on the PES-NWI/Q for four units: Question 4, Staff Development; Question 14, High Standards; and Question 25, Preceptor Program. However, the difference in means scores between the groups was small with the effect size. Post-hoc comparisons using the Tukey HSD test indicated that the mean score for Group 1 was significantly different than the mean score for Group 4 specific to Question 4. Post-hoc comparison also revealed statistically significant difference between Group 1 and Group 3 on Questions 14 and 25.

The significance of these results needs further analysis. However, the findings suggest the educational platform for these units needs to be enhanced. Alternatively, as RN educational level increases, their expectation for continued learning opportunities is

heightened. In either case, more exploration is needed to develop greater understanding (see Appendix E).

Multivariate Analysis of Variance

Preliminary assumption testing was run utilizing descriptive statistics explore function to check for normality, as well as univariate and multivariate outliers; there were no violations found. Then, one-way between-group MANOVA was conducted to explore the independent variables of the unit, nursing degree, and professional value model. I performed analysis of three dependent variables – Achievement of NC, Achievement of QC, and Achievement of PVR. There was a statistical difference between units on the combined variables, $F(3, 47)=7.13$, $p=.000$, Pillai's Trace =13.00 and partial eta squared =.50. A separate analysis of the dependent variables, applying Bonferri adjustment to control for Type 1 error, adjusted alpha was .017. At this level, the only variable to reach statistical significance was Achievement of QC, $F(3, 47)=7.13$, $p=.000$, and partial eta squared =1.00.

MANOVA was utilized to explore achievement of the PVS productivity model, utilizing MBI-EE, PES-NWI/Q, PES-NWI/S, Falls, CAUTI, and HAPU. Preliminary data analysis for outliers utilized linear regression analysis. Maximum Mahalanobis distance was found to be 11.34, with a critical value 18.47 based on the dependent variables utilized. One-way between-group MANOVA explored the MBI-EE, PES-NWI/Q, PES-NWI/S, Falls, CAUTI and HAPU, and productivity model agreement. There was a statistical difference between models on the combined variables. The separate analysis of the dependent variables, applying Bonferri adjustment to control for

Type 1 error, adjusted alpha was .006. At this level, four variables reached statistical significance: PES-NWI/Q Individual, patient falls, HAPU, and CAUTI. Effect size is large. This result indicates model achievement explains variable variance (PES-NWI/Q Individual 22.6%, Patient Fall 86.4%, HAPU 83.1% and CAUTI, 40.9%) (see Table 6).

For PES-NWI/Q individual, the mean is higher with the achievement of the PVS model (*M*=3.17, *SD*=.438), as compared to the current productivity model (*M*=2.94, *SD*=.438). A significant difference was demonstrated with HAPU and CAUTI with the model comparison. However, with fall rates, the opposite effect was noted. This analysis indicated that as professional value mean increased, so did the perception of quality care delivery. Additionally with elevated PVS, rates for HAPU and CAUTI are decreased. The finding of the fall rate increase with PVS elevation is unclear and requires further evaluation to understand its significance.

Finally, MANOVA was utilized to explore variation in national benchmarking data by unit, utilizing dependent variables of NC Ratio-MC, NC Ratio-PDAH, QC Ratio, and PVR. There was a statistical difference between units on the combined variables, $F(9, 102)=1033.292$, $p=.000$, Wilk's Lambda =.000 and partial eta squared =.974.

A separate analysis of the dependent variables, applying Bonferri adjustment to control for Type 1 error, adjusted alpha was .005, was then performed. At this level, three variables reached statistical significance: NC Ratio-MN, NC Ratio-PDAH, and PVR . The effect sizes for NC Ratio-MN, and NC Ratio-PDAH are moderate (55.2% and 34.7%, respectively). The effect size for PVR, however, is large (98%) indicating that the variance in these variables is explained by the work unit (see Appendix F).

Table 6

Multivariate analysis of NC and QC means as measured by achievement of PVS model

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	MBI-EE Individual Mean	1.392[a]	2	.696	.438	.648	.019
	PES Staffing Resource Individual	.048[b]	2	.024	.127	.881	.006
	PES Quality Individual	1.174[c]	2	.587	6.571	.003	.226
	Patient fall rate unit	64.348[d]	2	32.174	143.015	.000	.864
	HAPU rate unit	15.122[e]	2	7.561	110.969	.000	.831
	CAUTI rate unit	77.229[f]	2	38.615	15.552	.000	.409
Intercept	MBI-EE Individual Mean	405.964	1	405.964	255.790	.000	.850
	PES Staffing Resource Individual	289.810	1	289.810	1543.89	.000	.972
	PES Quality Individual	413.694	1	413.694	4632.99	.000	.990
	Patient fall rate unit	352.285	1	352.285	1565.91	.000	.972
	HAPU rate unit	83.391	1	83.391	1223.87	.000	.965
	CAUTI rate unit	224.938	1	224.938	90.594	.000	.668
ModelAchieve	MBI-EE Individual Mean	1.392	2	.696	.438	.648	.019
	PES Staffing Resource Individual	.048	2	.024	.127	.881	.006
	PES Quality Individual	1.174	2	.587	6.571	.003	.226
	Patient fall rate unit	64.348	2	32.174	143.015	.000	.864
	HAPU rate unit	15.122	2	7.561	110.969	.000	.831
	CAUTI rate unit	77.229	2	38.615	15.552	.000	.409
Error	MBI-EE Individual Mean	71.419	45	1.587			
	PES Staffing Resource Individual	8.447	45	.188			
	PES Quality Individual	4.018	45	.089			
	Patient fall rate unit	10.124	45	.225			
	HAPU rate unit	3.066	45	.068			
	CAUTI rate unit	111.731	45	2.483			
Total	MBI-EE Individual Mean	540.000	48				
	PES Staffing Resource Individual	341.875	48				
	PES Quality Individual	461.648	48				
	Patient fall rate unit	394.754	48				
	HAPU rate unit	112.998	48				
	CAUTI rate unit	549.874	48				
Corrected Total	MBI-EE Individual Mean	72.811	47				
	PES Staffing Resource Individual	8.495	47				
	PES Quality Individual	5.192	47				
	Patient fall rate unit	74.472	47				
	HAPU rate unit	18.188	47				
	CAUTI rate unit	188.961	47				

For NC Ratio-MN, Group 4: CCU mean demonstrates a statistically significant difference when compared to the other three groups (see Figure 9). Mean by unit showed no significant variation between the four units: Medical (*M*=1.028, *SD*=.017), Surgical (*M*=1.014, *SD*=.018), PCU (*M*=1.112, *SD*=.014) and CCU (*M*=1.067, *SD*=.0.25) (see Figure 10).

When staffing hours are corrected and aligned with actual patient care hours, improved staffing analysis was possible. With the model correction, the PVR mean demonstrates a statistically significant difference for Surgical as compared with the three other units (see Table 7). Group 2: Surgical is closest to target, indicating their staffing matrix is consistent with patient care hours required. It is also noteworthy that Group 2: Surgical, also had the highest achievement specific to QC Ratio, with actual performance nearing target benchmark (see Figure 11). This finding showed alignment with increased PVS demonstrating improvement in quality care delivery.

Implications

The objectives of this project included a) exploration of the relationship between the organizational productivity standard and the investment in nursing through the practice environment and burnout instrument constructs; b) exploration of relationship between the quality and nursing composites, and productivity achievement; and c) exploration of the combined effect of the constructs will be used as a means to explore the relationship between productivity and the professional value models and a new

Figure 9. NC utilizing MN methodology to demonstrate achievement of current productivity model.

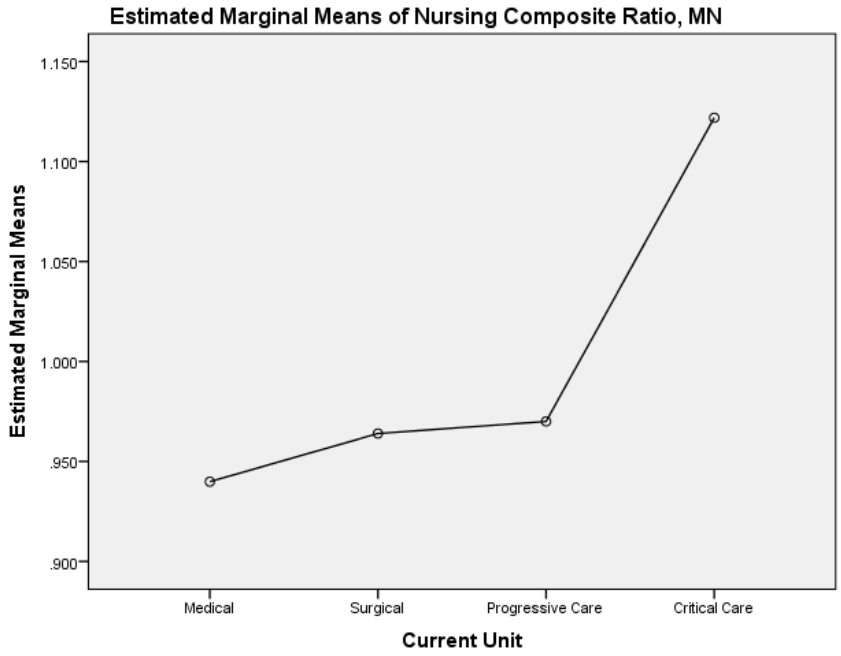


Figure 10. NC utilizing PDAH methodology to demonstrate achievement of PVS productivity model.

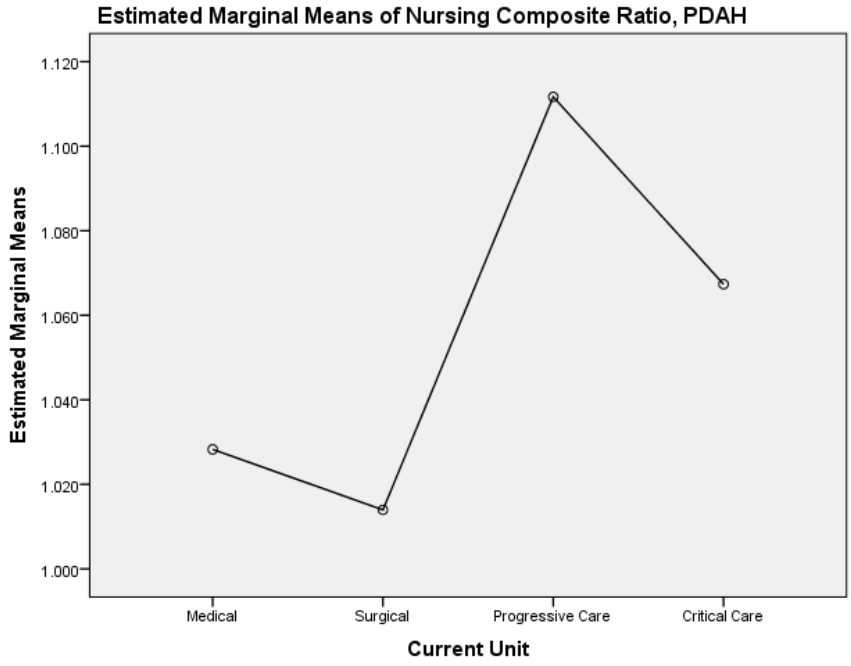
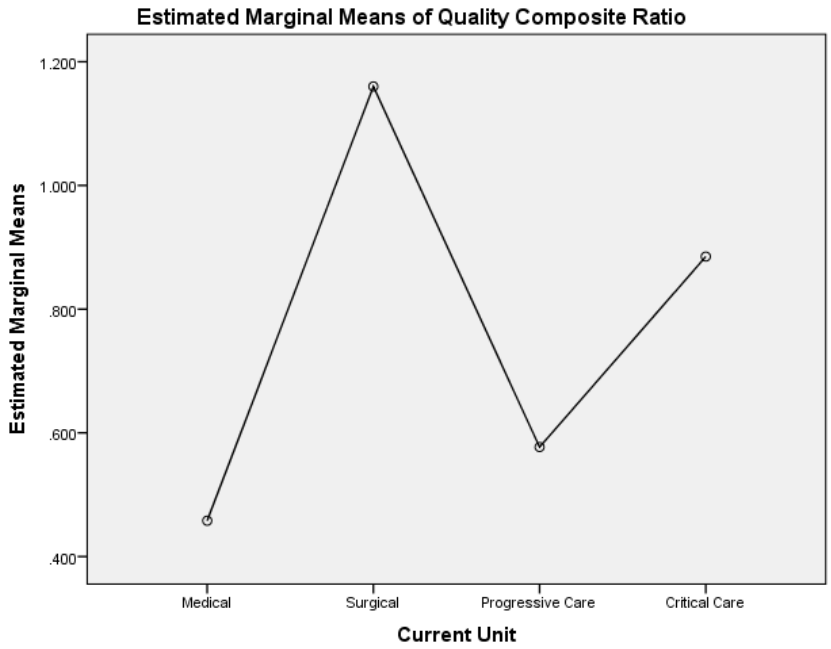


Table 7

Multivariate analysis of variance exploring key PVS variables, by unit

Current Unit		Mean	Std. Deviation	N
NC Ratio, MN	1.00 Medical	.93988	.065291	12
	2.00 Surgical	.96397	.053394	11
	3.00 PCU	.97000	.039220	19
	4.00 CCU	1.12187	.054118	6
	Total	.98007	.074739	48
NC Ratio, PDAH	1.00 Medical	1.02827	.078033	12
	2.00 Surgical	1.01395	.059165	11
	3.00 PCU	1.11167	.051445	19
	4.00 CCU	1.06734	.049069	6
	Total	1.06289	.072600	48
QC Ratio	1.00 Medical	.45800	0.000000	12
	2.00 Surgical	1.16000	0.000000	11
	3.00 PCU	.57700	0.000000	19
	4.00 CCU	.88500	0.000000	6
	Total	.71935	.273091	48
PVR Individual Ratio, PDAH	1.00 Medical	.44813	.034531	12
	2.00 Surgical	1.15005	.065099	11
	3.00 PCU	.52096	.024335	19
	4.00 CCU	.83106	.039411	6
	Total	.68568	.283046	48

Figure 11. QC demonstrating achievement of target specific quality metrics.



productivity metric proposed. The study demonstrated achievement of all project objectives with statistical significance demonstrated, as detailed above.

The ability to accurately measure staffing is essential to achieve the identified quality metrics of an organization and afford an improvement in patient care. The data reveals that the PVS represents a viable method to analyze staffing needs in the framework of quality outcomes. The PVR of the medical unit is currently suboptimal to achieve desired quality expectations. This researcher proposes that the undeveloped level of professional expertise, specific to the unit knowledge base, creates an environment of increased stress which results in a sense of decreased professional value. While the medical unit survey respondents perceive they deliver high quality of care, the defined quality metrics draw an opposite picture. I identified disconnect between perceived and

actual quality which served to further decrease the professional value and increased the environmental stress.

This study revealed the PVS productivity model is a statistically proven method to evaluate differences in the nursing care workforce of the hospital research site. The extensive statistical analysis revealed that the PVS model is a tool that can be utilized to explore the relationship between quality and nursing composites of the hospital-based nursing units, and as an innovative tool to measure unit productivity. I demonstrated that as PVS improves, the QC score decreases, which signifies an improvement in the achievement of quality metrics. Further, it is recognized that when NC declines, there is an associated decline in the achievement of quality metric. Additional, it is noted that when MBI-EE mean declines, signifying a reduction of stress experienced by the staff, quality metrics also improve; however, when MBI-EE is high, quality metric achievement remains low.

Analysis of PVS revealed a large effect size as such it demonstrates that PVS achievement explains the variance noted in means for non-achievement. The data suggests that low PVS may be related to knowledge, skill and experience level of the RN. Unreasonable demands framed by the experience and knowledge level of the respondent result in increased psychological stress and poor quality outcomes. The analysis showed a statistical difference between the PVS and existing productivity model. As such, PVS model was identified as a valuable tool to support the redesign of hospital-based inpatient nursing units as a mechanism to create an alignment between resource requirements and goal achievement.

Finally, PDAH analysis revealed Surgical alignment between staffing hours and patient care volume. The ensuing result was the achievement of quality metrics and the highest PVS of the sample population. Conversely, Medical and PCU staffing matrix is noted to be suboptimal for patient volume, when corrected for PDAH, and is demonstrated by reduced PVS and accompanying reduction in quality metrics achievement.

When analyzing the data through highest nursing degree achieved, ADN respondents experienced lower MBI-EE than their BSN counterparts, regardless of the unit, and perceived higher levels of staffing and resource adequacy. Additionally, ADN respondents reported the perception of higher quality care delivery than their BSN colleagues. However, it is suggested that the disconnect between an individual's perception of quality care delivery and resultant quality benchmarking data may result in increased stress and further reduction of PVS. Without correction, this may result in negative cycling with further erosion of PVS and reduced achievement of quality metrics.

This researcher suggests PVS is a sensitive measure that would allow administrators to fine-tune staffing to support the needs of the staff and thereby facilitate improved achievement of desired quality outcomes.

Policy

The PVS productivity model was shown to provide statistically significant data specific to the hospital-based inpatient units in an identified hospital setting. The researcher recognizes that additional evaluation is required to support initial findings.

However, the PVS model could serve as a tool to support future policy reform to improve patient care delivery while effectively managing costs.

Practice

Research consistently identifies RNs should practice to the full extent of their license. Each RN and every patient bring a different set of experiences and need to the hospital environment; yet, no effective tools exist to measure this broad experience as a way to identify effective staffing levels. Further exploration of the PVS productivity model could support practice change at the frontline level. This change could support improved patient care outcomes, and the health and wellbeing of our nursing staff as an essential means to achieve quality outcomes.

Research

Further research is essential for understanding the role of PVS productivity model in the hospital-based setting. Current tools are outdated and do not accurately measure the resources required to optimize the care delivery systems. However, hospital administrators are slow to accept assertive redesign structures. It is essential that additional research be undertaken to demonstrate further statistically significant innovation and practice change, to assure redesign of our currently failing healthcare systems.

Social Change

Our aging population, with increased morbidity and mortality indices, is looking to healthcare systems with heightened expectations. It is time for healthcare systems to partner with the professional nurse as a means to provoke sweeping change in the broken

delivery system. Patients expect hospitals to help them regain their health. Continual community and global pressure will provide the impetus for healthcare systems to change long-ingrained, nonproductive practices, and foster a culture of professionalism and attainment of healthcare quality. Unfortunately, continued hesitancy to adopt practice change and redesign broken practices only serves as a barrier to the achievement of this goal and further erodes the fiscal viability of the very healthcare system resistance is attempting to protect. Recognition of the professional value of the nurse is a significant first step in this recovery process. When nurses are recognized for their professional value, everyone will experience lasting benefits.

Strengths and Limitations of the Project

Strengths

Statistically significant differences were demonstrated with the utilization of the PVS model and as such, it warrants further exploration as a mechanism to improve patient care quality outcomes while maintaining fiscal stewardship through optimized RN staffing levels. The research protocol reinforces that the current productivity model is limited in its understanding of the factors contributing to quality patient outcomes. Further, the PVS model has been demonstrated as a viable option to provide mathematical clarity to the hospital environment and as a means to measure nurse staffing needs through quality outcomes.

Limitations

Limitations identified about this study are the single hospital environment and the respondent population. Because of the rural setting and small size of the hospital units,

with staff floating among units, it is recognized that an element of "group think" may have been infused in the survey respondent answers. Further, many survey respondents know the researcher due to the small size of the research site, and bias may result. Both these limitations may create challenges or limit ability to generalize study findings to a larger organization. Finally, as a novice researcher, my expertise in survey development and statistical analysis must be identified as a limitation. While steps were taken to control for errors, the lack of research sophistication may have introduced an inaccurate statistical analysis of survey findings**.**

Recommendations for remediation of limitations in future work

Recommendations for remediation of limitations include repeat study protocol in a larger organizational environment to decrease potential acquaintance bias. Age and gender, removed from the original protocol at IRB request, may provide a more robust analysis and should be considered for future study. Further, the collaboration with a statistician to support statistical analysis may prove beneficial for further research. Additionally, exploration is needed to develop deeper understanding of the role of nursing degree in the development of professional value. As well, the impact of environmental stress on respondents' ability to perform at their highest level should be evaluated. Finally, in-depth evaluation of the unit-unit differences to understand the underlying causes of the professional value development and quality outcome achievement as deemed essential to promote widespread adoption of the PVS productivity model.

Analysis of Self

As scholar

When I think of myself as a scholar, I must admit I still do not truly fit into this mold. Literature inquiry and process change have always been rewarding for me, but to transition this passion into the role of scholar has always created a certain level of discomfort. Technically, I understand and relish engagement with the scholarly literature and find it most rewarding when the evidence-based message comes to fruition. However, implementation is often the most challenging portion of any scholarly project.

As Practitioner

As a practitioner, I thrive on evidence-based research. I continually question and explore. For me, this type of inquiry represents the heart of nursing's past and provides the pathway to its future. While the responsibility of this task is at times overwhelming, the ability to make a meaningful difference in the lives of the patient population makes the discomfort more than worth the effort.

As Project Developer

Surprisingly, I found the role of project developer to be quite rewarding. The lines between my professional and academic lives frequently blurred as I explored the possibilities of practice change through evidence-based research and knowledge. The scholarly inquiry has most certainly become part of my daily life, and it is with sincerest hope that I will see the fruits of my academic labors come to light. I have learned to trust in my knowledge and expertise, to be tenaciously persistent to evidence-based practice

change, and a devoted champion to the nursing profession and practicing to the extent of licensure.

Project and Future Professional Development

Analyzing the results of PVS implementation to validate initial findings and assumptions would present a rewarding opportunity for future professional development. Immersion in the scholarly research has heightened my awareness that, often change must be forced for a significant reaction to occur. To accomplish this, I must pursue continued and relentless focus on evidence-based practice alignment.

Summary and Conclusions

PVS productivity model is found to demonstrate statistically significant results and is a tool to improve health care delivery through focused attention on optimal staffing levels required to achieve desired quality and patient care outcomes. While there are risks with any practice change, there are most certainly proven risks in not creating practice change. It is with this philosophical adoption that realistic and lasting improvement to our health care delivery system will finally be achieved.

Section 5: Scholarly Product

Project Summary and Evaluation Report

Project Summary and Evaluation Report

The overall purpose of this project was to explore the relationship between the current productivity model utilized by the parent organization and the proposed Professional Value Score (PVS) model. To further understand this concept, the relationship between the innovative productivity model was explored for the hospital-based RN in a rural hospital setting.

Formative evaluation was utilized as a framework for the evaluation plan. It was recognized that the construct of professional value was immature and additional clarity was necessary. Through the study framework and data analysis, evaluation activities were instrumental in defining solutions and identifying questions for future research specific to the professional value construct.

The objectives of the project were to:

1. Explore the relationship between the organizational productivity standard and the investment in nursing through the practice environment and burnout constructs.
2. Explore the relationship between the quality and nursing composites, in relation to productivity achievement.
3. Explore the combined effect of the above constructs as a means to understand the relationship between existing productivity standard and professional value model.

Intermediate outcome for this project was to develop a functional productivity measure to promote achievement of quality patient care outcomes through alignment with nurse staffing levels. The ultimate outcome, of course, would be to deploy the new model as a means to improve quality outcomes through achievement of optimum staffing levels for patient care needs.

In order to understand the defined objectives, three tactics of formative evaluation, time frame, target population, and measurement criteria, were utilized.

A. Time: was the study time frame appropriate to achieve intermediate outcomes?

The study time frame was dictated by the researcher's academic expectations. Pre-notification of survey opportunity was accomplished by posters on the units of interest for a week prior to study deployed. Additionally, electronic reminder notification was sent 7 and 10 days after survey deployment.

An acceptable response rate was obtained (47.1%) with good representation from all four units in the study population. However, without the limitations imposed through the academic climate, a longer study deployment may have yielded an increased response rate.

B. Target Population: was the target population adequate?

The units selected for the study included medical, surgical, progressive care and critical care. These four units were specifically selected related to: 1) availability to researcher; 2) commonality of units across the national healthcare arena; and 3) availability of extensive research protocols and scholarly literature specific to these hospital-based units.

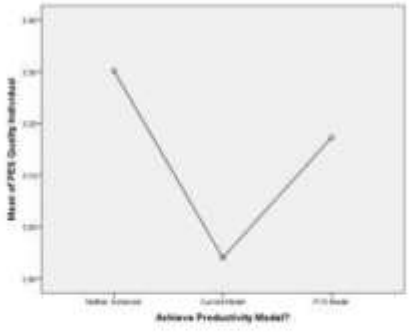
Specific literature search, focusing on literature between 2005 and 2014, with key word search "professional value", "nursing productivity", "nurse staffing" and "patient outcomes" revealed 217 articles, with 52 ultimately selected for consistency with project objectives.

The selected target population was deemed appropriate for the study protocol and supported achievement of the project objectives.

C. **Measurement Criteria: what instrumentation and data was needed to explore the concepts?**
Maslach Burnout Inventory, Emotional Intelligence (MBI-EE) and Practice Environment Scale-Nursing Workforce Index (PES-NWI) were utilized as they have demonstrated high reliability and validity in the nursing literature. To augment this instrumentation, respondent demographic data, national and parent organization financial and quality data were reviewed.

Objective 1: ***Explore the relationship between the organizational productivity standard and the investment in nursing through the practice environment and burnout constructs***

Descriptive statistical analysis was employed to explore the relationship between the organizational productivity standard and the proposed PVS model. Findings revealed a statistically significance difference between units on the combined variables with large effect size demonstrated. Further, it was noted that MBI-EE mean markedly decreased utilizing the PVS model, with an associated improvement in the QC.



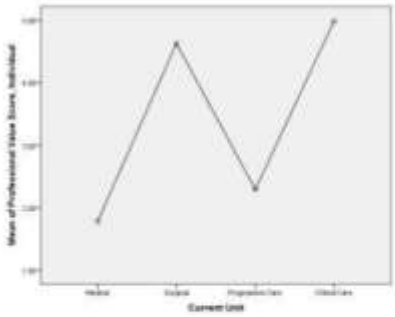
Objective 2: ***Explore the relationship between the quality and nursing composites, in relation to productivity achievement***

Nursing Composite (NC) score was calculated utilizing means scores MBI-EE and PES-NWI and nurse care hours for both the organizational and the PVS productivity models. A composite score was obtained for each unit and analyzed against a national comparative.

Quality Composite (QC) score, utilizing nurse sensitive indicators, was similarly calculated for each unit and analyzed against the national comparative. The result of this calculation is the PVS. There was demonstration of a statistically significant relationship between Nursing and Quality composites, and the resultant PVS (p<0.01).

Objective 3: ***Explore the combined effect of the above constructs as a means to understand the relationship between existing productivity standard and professional value model***

Analysis clearly defines a relationship between NC and QC and overall professional value experienced by the nursing staff. Using this methodology, statistically significant difference was demonstrated. The below graph represents the PVS, by unit. Both Medical and PCU demonstrate decreased professional value scores and opportunity exists to further explore the dynamics on these units to help support improved professional image as a means to achieve quality patient care outcomes.



Conclusion

The ability to accurately measure nurse staffing is essential to achieve identified quality metric and afford improvement in patient care. The data reveals the PVS formula represents a viable method to analyze staffing needs in the framework of quality outcomes.

References

Aguayo, R., Vargas, C., de la Fuente, E. I., & Lozano, L. M. (2011). A meta-analytic reliability generalization study of the Maslach Burnout Inventory. *International Journal of Clinical and Health Psychology*, 11(2), 343-361.

Aiken, L. H., Sloane, D. M., Bruyneel, L., Van den Heede, K., & Sermeus, W. (2013). Nurses' reports of working conditions and hospital quality of care in 12 countries in Europe. *International Journal of Nursing Studies*, 50(2013), 143-153.

American Hospital Association. (2013). Reconfiguring the bedside care team of the future. American Hospital Association. Retrieved from ananews.com/ahanews/jsp/display.jsp?dcrpath=AHANEWS/AHANewsArticle/data/AHA_News_110813_bedcare.

American Nurse Association. (2010). Nursing: Scope and standards of practice. Nursebooks.org. Retrieved from http://www.nursingworld.org/scopeandstandardsofpractice.

Ausserhofer, D., Schubert, M., Desmedt, M., Blegen, M. A., De Geest, S., & Schwendimann, R. (2013). The association of patient safety climate and nurse-related organizational factors with selected patient outcomes: A cross-sectional survey. *International Journal of Nursing Studies*, 50 (2013), 240-252.

Ball, J. E., Murrells, T., Rafferty, A. M., Morrow, E., & Griffiths, P. (2014). Care left undone during nursing shifts: Associations with workload and perceived quality of care. *BMJ Quality and Safety*, 23, 113-125.

Blegen, M. A., Donaldson, N., Seago, J. A., & Shapiro, S. (2009). Impact of patient safety initiatives on nursing workflow and productivity. Retrieved from www.academyhealth.org/files/interestgroups/nursing/2009/Blegen.pdf.

Buerhaus, P. I., Doneland, K., DesRoches, C., & Hess, R. (2009). RN's perceptions of nurse staffing ratios and new hospital payment regulations. *Nursing Economic$,* 27(6), 372-376.

Calnoc. (2014). Calnoc benchmarking report: Falls and HAPU 3+ incidence by unit. Retrieved using Providence Health Systems Quality Department.

Carmenico, A., (2011). Marquette professors find nurse staffing, overtime hours affect readmission rates, emergency room visits. Retrieved from http://www.news.edu/news-releases/marquette-professors-find-nurse-staffing-overtime-hours-affect-readmission-rates-emergency-room-visits.

Carayon, P., & Gurses, A. P. (2008). Nursing workload and patient safety: A human factors engineering perspective. In: Hughes, R. G., editor. Patient Safety and Quality: An evidence-based handbook for nurses, chapter 30, 2/230-2/236. Rockville, MD. Agency for Healthcare Research and Quality. Retrieved from http://www.ncbi.nih.gov/books/NKB2657.

Choi, J., Boyle, D. K., & Dunton, N. (2014). A standardized measure: NDNQI nursing care hour's indicator. *Western Journal of Nursing Research,* 36(1), 105-116.

Culver Clark, R., & Allison-Jones, L. (2011). Investing in human capital: An academic-service partnership to address the nursing shortage. *Nursing Education Perspective,* 32(1), 18–21.

DeBono, S., Heling, G., & Borg, M. A. (2014). Organizational culture and its implications for infection prevention and control in healthcare institutions. *Journal of Hospital Infection,* 86(2014), 1-6.

DeVillers, M. J., & DeVon, H. A. (2012). Moral distress and avoidance behavior in nurses working in critical care and noncritical care units. *Nursing Ethics,* 20(5), 589–603.

Dubois, C-A., D'Armour, D., Pomey, M-P., Girard, F., & Brault, I. (2013). Conceptualizing performance of nursing care as a prerequisite for better measurement: A systematic and interpretive review. *BioMed Central,* 1-20.

Dudeck, M. A., Weiner, l. M., Allen-Bridson, K., … Edwards, R. J. (2013). National healthcare safety network (NHSN) report, data summary for 2012, device-associated module. *American Journal of Infection Control,* 1148-1166.

Drake, D. A., Luna, M., Georges, J. M., & Barker Steege, L. M. (2012). Hospital nurse force theory. *Advances in Nursing Science,* 35(4), p. 305-314.

Eschiti, V., & Hamilton, P. (2011). Off-peak nurse staffing. *Dimensions of Critical Care Nursing*, 30(1), 62-69.

Goetz, K., Janney, M., & Ramsey, K. (2011). When nursing takes ownership of financial outcomes: Achieving exceptional financial performance through leadership, strategy, and execution. *Nursing Economic$*, 29(4), 173-182.

Graf, C. M. (2006). ADN to BSN: Lessons from Human Capital Theory. *Nursing Economic$,* 24(3), 135–142.

Harper, E. M. (2012). Staffing based evidence: Can health information technology make it possible? *Nursing Economic$,* 30(5), 262-281.

Hinno, S., Partanen, P., & Vehvilainen-Julkunen, K. (2011). Nursing activities, nurse staffing and adverse patient outcomes as perceived by hospital nurses. *Journal of Clinical Nursing,* 21, 1584-1593.

Institute of Medicine. (1999). *To err is human: Building a safer health system*. doi:10.1016/s1051-0443(01)70072-3.

Joint Commission on Accreditation of Healthcare. (2009). NSC implementation guide, 2009. Retrieved from www.jointcomission.org/assets/1/6/NSC%20Manual.pdf.

Jones, T. L., & Yoder, L. (2010). Economic theory and nursing administration research – it this a good combination? *Nursing Forum,* 45(1), 40–53.

Kalliath, T. J., O'Driscoll, M. P., Gillespie, D. F., & Bluedorn, A. C. (2000). A test of the Maslach Burnout Inventory in three samples of healthcare professionals. *Work and Stress,* 14(1), 35-50.

Kangasniemi, M., Vaismoradi, M., Jasper, M., & Turunen, H. (2013). Ethical issues in patient safety: Implications for nursing management. *Nursing Ethics,* 20(8), 904-916.

Keepnews, D., M. (2013). Mapping the economic value of nursing. Washington State Nurses Association. Retrieved from http://www.wsna.org/assets/entry-assets/Nursing-Practice/Publications/economic-value-of-nursing-white-paper.pdf.

Kelley, M. A., Connor, A., Kun, K. E., & Salmon, M. E. (2008). Social responsibility: Conceptualization and embodiment in a school of nursing. *International Journal of Nursing Education Scholarship,* 5(1), 1–16.

Kirwan, M., Matthews, A., & Scott, P. A. (2013). The impact of the work environment on nurses on patient safety outcomes: A multi-level modeling approach. *International Journal of Nursing Studies,* 50(2013), 253-263.

Klaus, S. F., Dunton, N., Gajewski, B., & Potter, C. (2013). Reliability of nursing care hour measure: A descriptive study. *International Journal of Nursing Studies,* 50, 924-932.

Kohr, L. M., Hickey, P. A., & Curley, M. A. (2012). Building a nursing productivity measure based on the Synergy Model: First steps. *American Journal of Critical Care,* 21(6), 420-430.

Kooker, B. M., & Kamikawa, C. (2010). Successful strategies to improve registered nurse retention and patient outcomes in a large medical centre in Hawaii. *Journal of Clinical Nursing,* 20, 34-39.

Kutney-Lee, A., Wu, E. S., Sloane, D. M., & Aiken, L. H. (2013). Changes in hospital nurse work environments and nurse job outcomes: an analysis of panel data. *International Journal of Nursing Studies,* 50(2013), 195-201.

Lake, E. T. (2007). The nursing practice environment: Measurement and evidence. *Medical Care Research and Review,* 64(2), 104S-122S.

McDonough, K. S. (2013). Development of the McDonough Optimum Staffing Method: Evidence-driven recommendations based on patient demand. *Virginia Nurses Today, May/June/July* 2013, 8-11.

McGillis Hall, L. (2003). Nursing intellectual capital: A theoretical approach for analyzing nursing productivity. *Nursing Economics,* 21(1), 14-19.

McHugh, M. D., Berez, J., & Small, D. S. (2013). Hospitals with higher nurse staffing had lower odds of readmissions penalties than hospitals with lower staffing. *Health Affairs,* 32(10), 1740-1747.

McKenna, E., Clement, K., Thompson, E., … & Roda, P. I. (2011). Using a nursing productivity committee to achieve cost savings and improve staffing levels and staff satisfaction. *Critical Care Nurse,* 31(6), 55-65.

Morris, R., MacNeela, P., Scott, A., Treacy, P., & Hyde, A. (2007). Reconsidering the conceptualization of nursing workload: Literature review. *Journal of Advanced Nursing,* 57(5), 463-471.

Myny, D., Van Goubergen, D., Gobert, M., Vanderwee, K., Van Hecke, A., Defloor, T. (2011). Non-direct patient care factors influencing nursing workload: A review of the literature. *Journal of Advanced Nursing,* 67(10), 2109-2129.

National Database of Nursing Quality Indicators. (2012). Guidelines for data collection on the American Nurses Association's National Quality Forum endorsed measures. Retrieved from http://www.k-hen.com/Portals/16/ANAs%20NQF%20specs.pdf.

National Quality Forum. (2012a). NQF #0202 Nursing hours per patient day: Measure submission and evaluation worksheet 5.0. Retrieved from http://www.qualityforum.org/Standards/Measures/Nursing_care_hours_per_patient_day_(RN,_LPN,_and_UAP).aspx.

National Quality Forum. (2012b). NQF #0206 Practice environment scale – nurse work index: Measure submission and evaluation worksheet 5.0. Retrieved from http://www.qualityforum.org/QPS/QPSTool/Practice-environment-scale-nurse-work-index.aspx.

Parker, D., Tuckett, A., Eley, R., & Hegney, D. (2010). Construct validity of Practice environment scale of the nurse work index for Queensland nurses. *International Journal of Nursing Practice,* 16(4), 352-358.

Pisanti, R., Lombardo, C., Lucidi, F., Violani, C., & Lazzari, D. (2012). Psychometric properties of the Maslach Burnout Inventory for human services among Italian nurses: a test of alternative models. *Journal of Advanced Nursing,* 69(3), 697-707.

Robert Wood Johnson Foundation. (2008). A new era in nursing: Transforming care at the bedside. The Robert Wood Johnson Foundation and the Institute for Healthcare Improvement. Retrieved from www.rwjf.org/content/dam/web-assets/2008/06/transforming-care-at-the-bedside.

Shever, L. L. (2011). The impact of nursing surveillance on failure to rescue. *Research and Theory for Nursing Practice,* 25(2), 107-126.

Spetz, J., Donaldson, N., Aydin, C., & Brown, D. S. (2011). How many nurses per patient? Measurement of nurse staffing in health services research. *Health Services Research,* 43(5), 1674-1692.

Terry, A. J. (2012). *Clinical research for the doctor of nursing practice*. Jones & Bartlett Publishers; Sudbury, MA.

Upenieks, V. V., Akhavan, J., & Kotlerman, J. (2008). Value-added care: A paradigm shift in patient care delivery. *Nursing Economics,* 26(5), 294-301.

Weis, D., & Schank, M. J. (2009). Development of psychometric evaluation of the nurses professional values scale – revised. *Journal of Nursing Measurement,* 17, 221-231.

White, K. M., & Dudley-Brown, S. (2012). *Translation of evidence into nursing and health care practice*. Springer Publishing Company: New York, NY.

Appendix A: Survey Invitation Letter

Dear [FirstName],

You are invited to participate in a research study titled "Moving from Productivity to Professional Value Model of the Hospital-Based Registered Nurse". This study is being conducted by Crystal Billings, RN, MN, LNC, student researcher, under the guidance of her research committee at Walden University, Doctor of Nursing Practice program. The purpose of this study is to explore the relationship between current productivity standard in the hospital inpatient units, and its relationship with the Professional Value Model.

In this study, you will be asked to complete an electronic survey. Your participation in this study is voluntary, and you are free to withdraw your participation from this study at any time. The electronic survey should only take 10 minutes to complete.

This study has been approved by the Institutional Review Boards of the research site and Walden University. There are no risks associated with participating in this study.

While you will not experience any direct benefits from participating, information collected in this study may benefit the profession of nursing in the future by identifying a better means to measure the professional value of nursing as it relates to productivity and patient care outcomes.

If you have questions regarding the survey or this research, please contact Crystal Billings, Student Researcher or her advisor, Dr. Allison Terry.

By completing and submitting this survey, you are indicating your consent to participate in the study.

Your participation is greatly appreciated.
Crystal Billings, RN, MN, LNC,
Doctoral Candidate, Walden University

Please click on the survey link below and provide your feedback no later than AUGUST 10, 2015.

[SurveyLink]

This link is uniquely tied to this survey and your email; please do not forward the message.
Please note: If you do not wish to receive further emails from the researcher regarding this study, please click the link below, and you will automatically be removed from the mailing list.

[RemoveLink]

Appendix B: Professional Value Score

Demographic Information

1	Total Years as a Registered Nurse					
2	Years as an RN on your current unit					
3	Current Unit (where you work the majority of your FTE):	☐ Medical	☐ Surgical	☐ Progressive Care	☐ Critical Care	☐ Other
4	Current FTE (hours per 2 week pay period	☐ 0.0 to 0.4	☐ 0.41 to 0.6	☐ 0.61 to 0.8	☐ 0.81 to 1.0	
5	In addition to your FTE, how many additional hours do you work in a 2 week period?	☐ None	☐ More than one but less than 10 hrs	☐ More than 10 but less than 20 hrs	☐ More than 20 hrs	
6	Current shift?	☐ Day	☐ Evening	☐ Night		
7	Highest nursing degree attained?	☐ ADN	☐ BSN	☐ MN/MSN	☐ Doctoral	

For each item, please indicate the extent to which you agree that the item is **PRESENT in your current job**. Indicate the degree by selecting the appropriate number.

		Every Day 7	A few times a week 6	Once a week 5	A few times a month 4	Once a month or less 3	A few times a year or less 2	Never 1
1	I feel emotionally drained from my work	☐	☐	☐	☐	☐	☐	☐
2	I feel used up at the end of the work shift	☐	☐	☐	☐	☐	☐	☐
3	I feel fatigued when I get up and have to face another day	☐	☐	☐	☐	☐	☐	☐
4	Working with people all shift is really a strain for me	☐	☐	☐	☐	☐	☐	☐
5	I feel burned out from my work	☐	☐	☐	☐	☐	☐	☐
6	I feel frustrated from my job	☐	☐	☐	☐	☐	☐	☐
7	I feel I'm working too hard on my job	☐	☐	☐	☐	☐	☐	☐
8	I feel like I'm at the end of my job	☐	☐	☐	☐	☐	☐	☐

For each item, please indicate the extent to which you agree that the item is **PRESENT in your current job**. Indicate the degree by selecting the appropriate number.

		Strongly Agree 4	Agree 3	Disagree 2	Strongly Disagree 1
1	Adequate support services allow me to spend time with my patients.	☐	☐	☐	☐
2	Active staff development or continuing education programs for nurses.	☐	☐	☐	☐
3	Enough time and opportunity to discuss patient care problems with other nurses.	☐	☐	☐	☐
4	Enough registered nurses to provide quality care.	☐	☐	☐	☐
5	Enough staff to get the work done.	☐	☐	☐	☐
6	High standards of nursing care are expected from administration.	☐	☐	☐	☐
7	A clear philosophy of nursing that pervades the patient care environment.	☐	☐	☐	☐
8	Working with nurses who are clinically competent.	☐	☐	☐	☐
9	An active quality assurance program.	☐	☐	☐	☐
10	A preceptor program for newly hired RNS.	☐	☐	☐	☐
11	Nursing care is based on a nursing, rather than medical, model.	☐	☐	☐	☐
12	Written, up-to-date nursing care plans for all patients.	☐	☐	☐	☐
13	Patient care assignments that foster continuity of care, i.e. the same nurse cares for the patient from one day to the next.	☐	☐	☐	☐
14	Use of nursing diagnoses.	☐	☐	☐	☐

Appendix C: Informed Consent

Purpose of the Study:

This is a study in nursing developed by Crystal Billings, a Doctor of Nursing Practice student at Walden University. The purpose of this study is to explore the relationship between current productivity standards in the hospital inpatient units, medical, surgical, progressive care and critical care, and its relationship with the professional value model.

What will be done:

As a study participant, you will complete a 30 question survey, which will take 10 to 15 minutes to complete. The survey includes personal demographic, as well as a series of Likert questions to explore your current nursing environment and the level of burnout experienced from interaction with this environment.

After completion of the survey, I will examine the content, and utilize descriptive and inferential statistical analysis of the Likert scale questions, as a means to evaluate the relationship between productivity and professional value of the hospital-based RN.

Benefits of this Study:

Through participation in this study, you will be contributing to advancing knowledge of the nursing professional value in the hospital-based organization. It is hoped that this study will promote increased understanding of the professional value of the bedside nurse to the hospital organization, and will serve to support the development of tools to measure this contribution to patient care outcomes.

Risks or discomforts:

The electronic based survey is completely anonymous. As such, no risks or discomforts are anticipated from taking part in this study. While it is hoped you will complete the entire survey, if you feel uncomfortable with any question, you can skip the question or withdraw from the study. If you decide to quit at any time before you have finished the questionnaire, your answers will NOT be recorded.

Confidentiality:

Your responses will be kept completely confidential. Your email address is not made available to me as you respond to the survey. Only I, as the researcher, will see the completed survey.

Decision to quit at any time:

Your participation is voluntary; you are free to withdraw your participation in the survey at any time. If you do not want to continue the survey, exit out of the survey website.

How the findings will be used:

The results of this study will be used for scholarly purposes only. The results of the study will be presented in the educational setting, and the result might be published in the professional journals in the field of nursing.

Contact Information:

If you have concerns or question about this study, please contact Crystal Billings at XXX or the Walden University Doctor of Nursing committee chairperson, Dr. Allison Terry at XXX.

By checking the box below and beginning the survey, you acknowledge that you have read the information and agree to participate in this research, with the knowledge that you are free to withdraw your participation at any time.

Appendix D: Profile of RN Respondents

Characteristics	Value	SD	n =
Highest Nursing Degree			48
Associate	70.8%		34
Bachelor	29.2%		14
Master or higher	0.0%		0
Working FTE Hours (mean)	3.54	0.87	48
0.00 to 0.4 (0 to 32 hrs) (1)	2.1%		1
0.41 to 0.6 (33 to 48 hrs) (2)	18.8%		9
0.61 to 0.8 (49 to 64 hrs) (3)	2.1%		1
0.81 to 1.0 (65 to 80 hrs) (4)	77.1%		37
Years as RN (mean)	13.43	3.95	48
< 5	22.9%		11
5 to 10	37.5%		18
11 to 15	8.3%		4
16 to 20	4.2%		2
> 20	27.1%		13
Years on Current Unit (mean)	7.63	2.80	48
< 5	50.0%		24
5 to 10	31.3%		15
11 to 15	10.4%		5
16 to 20	0.0%		0
> 20	8.3%		4
Shift			
Day	58.3%		28
Night	41.7%		20
Nursing Unit			
Medical	25.0%		12
Surgical	22.9%		11
PCU	39.6%		19
CCU	12.5%		6

Appendix E: PES-NWI/Q, Question Analysis

	Sum of Squares	df	Mean Square	F	Sig.
There is an active staff development or continuing education programs for nurses	2.913	3	.971	3.286	.029
	13.004	44	.296		
	15.917	47			
High standards of nursing care are expected from administration	3.825	3	1.275	4.911	.005
	11.425	44	.260		
	15.250	47			
There is a clear philosophy of nursing that pervades the patient care environment	.544	3	.181	.844	.477
	9.456	44	.215		
	10.000	47			
I work with nurses who are clinically competent	2.070	3	.690	1.991	.129
	15.243	44	.346		
	17.313	47			
There is an active quality assurance program	.416	3	.139	.476	.701
	12.834	44	.292		
	13.250	47			
There is a preceptor program for newly hired RNs	3.257	3	1.086	4.068	.012
	11.743	44	.267		
	15.000	47			
Nursing care is based on a nursing, rather than medical, model	.394	3	.131	.424	.737
	13.606	44	.309		
	14.000	47			
There are written, up-to-date nursing care plans for all patients	1.231	3	.410	1.452	.241
	12.435	44	.283		
	13.667	47			

Appendix F: MANOVA analysis of PVR

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
NC Ratio, MN	1.00 Medical	2.00 Surgical	-.02409	.021592	.682	-.08174	.03356
		3.00 PCU	-.03012	.019074	.401	-.08105	.02080
		4.00 CCU	-.18199*	.025864	.000	-.25105	-.11294
	2.00 Surgical	1.00 Medical	.02409	.021592	.682	-.03356	.08174
		3.00 PCU	-.00603	.019598	.990	-.05836	.04630
		4.00 CCU	-.15790*	.026253	.000	-.22800	-.08780
	3.00 PCU	1.00 Medical	.03012	.019074	.401	-.02080	.08105
		2.00 Surgical	.00603	.019598	.990	-.04630	.05836
		4.00 CCU	-.15187*	.024224	.000	-.21655	-.08719
	4.00 CCU	1.00 Medical	.18199*	.025864	.000	.11294	.25105
		2.00 Surgical	.15790*	.026253	.000	.08780	.22800
		3.00 PCU	.15187*	.024224	.000	.08719	.21655
NC Ratio, PDAH	1.00 Medical	2.00 Surgical	.01431	.025302	.942	-.05324	.08187
		3.00 PCU	-.08341*	.022351	.003	-.14308	-.02373
		4.00 CCU	-.03908	.030307	.574	-.12000	.04184
	2.00 Surgical	1.00 Medical	-.01431	.025302	.942	-.08187	.05324
		3.00 PCU	-.09772*	.022965	.001	-.15904	-.03640
		4.00 CCU	-.05339	.030763	.318	-.13553	.02875
	3.00 PCU	1.00 Medical	.08341*	.022351	.003	.02373	.14308
		2.00 Surgical	.09772*	.022965	.001	.03640	.15904
		4.00 CCU	.04433	.028386	.411	-.03146	.12012
	4.00 CCU	1.00 Medical	.03908	.030307	.574	-.04184	.12000
		2.00 Surgical	.05339	.030763	.318	-.02875	.13553
		3.00 PCU	-.04433	.028386	.411	-.12012	.03146
PVR Individual Ratio, PDAH	1.00 Medical	2.00 Surgical	-.70192*	.017109	.000	-.74760	-.65624
		3.00 PCU	-.07284*	.015114	.000	-.11319	-.03248
		4.00 CCU	-.38293*	.020494	.000	-.43765	-.32821
	2.00 Surgical	1.00 Medical	.70192*	.017109	.000	.65624	.74760
		3.00 PCU	.62908*	.015529	.000	.58762	.67055
		4.00 CCU	.31899*	.020802	.000	.26345	.37453
	3.00 PCU	1.00 Medical	.07284*	.015114	.000	.03248	.11319
		2.00 Surgical	-.62908*	.015529	.000	-.67055	-.58762
		4.00 CCU	-.31010*	.019194	.000	-.36135	-.25885
	4.00 CCU	1.00 Medical	.38293*	.020494	.000	.32821	.43765
		2.00 Surgical	-.31899*	.020802	.000	-.37453	-.26345
		3.00 PCU	.31010*	.019194	.000	.25885	.36135