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Implementation of a Nursing Workload Tool to Reduce Nurse Burnout

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IMPLEMENTATION OF A NURSING WORKLOAD TOOL TO REDUCE NURSE BURNOUT

by

NICOLE K. GREIVES

EVIDENCE-BASED PRACTICE PROJECT REPORT

Submitted to the College of Nursing and Health Professions

Of Valparaiso University,

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in partial fulfillment of the requirements

For the degree of

DOCTOR OF NURSING PRACTICE

2016

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Student

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Date

Date
DEDICATION

I would like to dedicate this project to my parents. They always stressed the value of an education. I would also like to dedicate it to my friends, as they supported me throughout school. This project is also dedicated to my office mates, who had to listen to me stress about school on a nearly daily basis.
ACKNOWLEDGMENTS

I would like to acknowledge my project advisor, Dr. Constance Sheets, for allowing me to focus on a project that had meaning to me as a nurse. I would also like to thank her for helping me grow and develop in my scholarly writing. I would also like to acknowledge Dr. Theresa Gibbs, my site advisor, who was a sympathetic ear throughout school and was willing to help in anyway. Finally, I would like to acknowledge the manager and nurses of the Medical Progressive Care Unit who were fully supportive of the project. Without their help, I would not have been able to complete the project or my program.
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ABSTRACT

Nursing burnout and workload is a complicated issue with far-reaching effects. Nursing burnout and inappropriate nursing workload have been linked to increased risk of urinary tract infection, respiratory infections, decreased patient satisfaction, decreased quality and safety of care, and increased mortality. The purpose of the project was to decrease nursing burnout on a Medical Progressive Care Unit (MPCU) by moving patients with high workloads and medical instability to a higher level of care. Within this project, Rosabeth Kanter’s Theory of Structural Power was used for the theoretical framework, and the Stetler Model guided the implementation. The intervention consisted of a presentation to Intensive Care Unit (ICU)/Pulmonary physicians on the correlation between workload, burnout, and other issues pertinent to MPCU such as current turnover rates and the inexperience of the nurses. The project also included a daily workload tool for each patient in the progressive care unit for the first two months in order to gather reliable data for the submitted proposal to improve nurse: patient ratios. The last four weeks of the project consisted of identifying patients at risk for transfer to the ICU due to their medical instability and then calculating the Nursing Activities Score (NAS). The NAS is a validated ICU level nursing workload tool utilized for this project. If the patient reached an ICU level workload of 54 and was deemed ICU appropriate, the goal was to move patients due to their workload and acuity. If the patient could not be moved due to extraneous factors such as lack of nursing staff in the ICU, then the pulmonary consult team, if appropriate, would consult. The Maslach Burnout Inventory (MBI) was utilized to measure burnout. It is made up of three subscales that are scored individually: Emotional Exhaustion (EE), Personal Accomplishment (PA), and Depersonalization (DP). Review of literature shows that emotional exhaustion correlates the most with nursing workload. Pre and post burnout scores were gathered with a burnout score mean for the EE subscale of 29.88. Post EE scores were 23.32. The paired t tail for emotional exhaustion was 5.55 with a p-value of < .001. The NAS mean score was 43.56 per patient that is lower than the ICU score of 54, but when considering increased number of patients per nurses in progressive care units, the workload may be higher. Results demonstrate that decreasing workload can improve the emotional exhaustion aspect of burnout. Results for the DP and PA subscales were not found to be significant.
IMPLEMENTATION OF A NURSING WORKLOAD TOOL

CHAPTER 1

INTRODUCTION

In 2003, the Institute of Medicine (IOM) called for all health care professionals to be able to deliver patient-centered, evidenced-based care as members of an interdisciplinary team (AACN, 2004). Evidence based nursing practice involves one to be able to ask a clinical question, perform a search for the best evidence, critically appraise the evidence that is found, and then integrate the evidence with one’s clinical expertise (Melynk & Fineout-Overholt, 2011). This should all be done while taking into consideration patients’ preferences and values (Melynk & Fineout-Overholt, 2011). One must also evaluate the outcomes of the changes that were made based on the evidence (Melynk & Fineout-Overholt, 2011). As advanced practice nurses, we are called to be able to provide patient focused, evidence-based care.

Background

The Affordable Care Act, which was passed by Congress in 2010, has pushed for healthcare reform and cost-cutting measures to be put into place by hospitals. This is because the focus of healthcare is changing from hospitals being paid by volume of patients to a focus on improving health outcomes and decreasing hospitalizations (Sherman & Bishop, 2012). Due to this, hospitals risk losing Medicare reimbursement if too many of their patients are readmitted within 30 days of discharge (Sherman & Bishop, 2012). Hospitals risk not being reimbursed for pressure ulcers, infections, and falls that occurred while in the hospital (Sherman & Bishop, 2012). Due to the potential for decreasing Medicare reimbursements, hospitals are implementing drastic-cost cutting measures. Unfortunately, this has trickled down to the bedside nurse. Nurses are usually the largest group of employees in the hospital, and therefore, the most expensive (Sherman & Bishop, 2012). This means that hospitals are trying to do more with less. This includes less nursing staff. The unit of focus for the Evidence Based Project (EBP) project had previously been able to flex up to ICU level staffing for a few patients per day. With
the concern for decreased reimbursements, this was stopped. Every nurse was to have three patients, regardless of nursing workload. Increased nursing workload, as will be evidenced in Chapter 2, appears to have an effect on nursing burnout. This EBP project served to address the question of whether the implementation of a nursing workload tool as a guide for proper placement of patients helped to decrease nurse burnout.

**Statement of problem**

Burnout is thought to be a syndrome that is associated with emotional exhaustion, a tendency to depersonalize client encounters, and cause a decreased sense of personal accomplishment (Poghosyan, Clarke, Finlayson, & Aiken, 2010). Therefore, burnout is thought to be a complex problem with long-reaching effects. Unfortunately, burnout is thought to be a common phenomenon worldwide among nurses (Poghosyan et al., 2010). In regards to burnout and the individual person, burnout has been associated with the development of serious health issues including depression, myocardial infarction, hypertension, cardiovascular disease, type II diabetes, insomnia and other problems (Flynn et al., 2009). Burnout in nurses has also been linked to decreased quality of care and increasing a patient's risk for infection (Cimotti, Aiken, Sloan, & Wu, 2012). There is also a link found between burnout and nurses' intent to leave their job (Flynn, Thomas-Hawkins, & Clarke, 2009). Therefore, burnout is a complicated problem with widespread negative consequences that can affect a nurse both personally and professionally.

**Data supporting the need for project**

As job burnout has been related to suboptimal care of patients, this is a true problem that affects not only nurses, but their patients as well. One study went so far as to demonstrate the effect of nurse staffing and burnout on health care associated infections such as urinary tract infections (UTIs) and surgical site infections. When looking at nurse staffing and the outcome of a UTI, the staffing coefficient was found to be 0.86 (P=.02). In other words, each additional patient that was assigned to a nurse was associated with a 0.86 unit (nearly 1 per 1,000 patients) increase in the rate of UTI. When looking at the same regression model for
surgical site infections, there was a significant staffing coefficient of 0.93 (P=.04). When looking at nurse burnout and the infection rate of UTI, the burnout coefficient was found to be 0.85 (P=.02). Cimmotti, Aiken, Sloan & Wu (2012) found the association between burnout and surgical site infections to be 1.58 (P<.01). Therefore, a 10% increase in high-burnout among nurses was thought to be associated with an increase of nearly 1 UTI and 2 surgical site infections among 1,000 patients. When nursing staffing and nurse burnout were combined, nurse burnout remained the most significant association with a coefficient of 0.82 (P=.03). Cimmotti et al. (2012) then estimated cost savings associated with decreased nurse burnout. It was estimated that when nursing burnout was decreased by as much as 30%, there would be a decrease of 6,239 fewer infections, with an estimated savings of up to $68 million. Given this evidence, there is a clear need for decreasing burnout which could be done by increasing nurse staffing (Cimotti et al., 2012).

Another article that looked at staffing and nurse burnout showed that each additional patient per nurse was associated with a 23% increase (Odds Ratio [OR], 1.23; 95% Confidence Interval [CI], 1.13-1.34) increase in the odds of burnout (Aiken, Clarke, Sloane, Sochalski, & Silber, 2002). This was even after controlling for nurse and hospital characteristics. The addition of each patient per nurse was also associated with a 7% increase in dying within 30 days of admission (OR, 1.07; 95% CI, 1.03-1.12) (Aiken et al., 2002). The results are also supported by the similar data in failure-to-rescue as well with a 7% increase (OR, 1.07; CI, 1.02-1.11) (Aiken et al., 2002).

A study, that looked at the effect of staffing on burnout showed an OR 1.12 with a range of 1.12-1.23 for the US. When adjusted for hospital characteristics, (teaching status, high technology, bed size) nursing characteristics, (age, sex, and full time employment status), specialty of unit, and country, the OR was 1.05 with a range of 1-1.1 (Aiken et al., 2012).

A meta-analysis of studies of nurses’ job satisfaction showed that decreased job stress had the most significant relationship with job satisfaction (Zangarao & Soeken, 2007). When
the results of 17 articles were pooled together in random effects model, the effect size for decreased job stress was \((ES=-.43)\) (Zangarao & Soeken, 2007). Nurse-physician collaboration also had a moderate effect size as well \((ES=.37)\) when pooling 7 articles results (Zangarao & Soeken, 2007). Increased autonomy was also moderate but had a significant relationship as well when 17 articles were pooled together \((ES=.30)\) (Zangarao & Soeken, 2007).

Another study Needleman et al. (2011) looked at staffing and inpatient mortality. Within this study, there was a significant association found between increased mortality and increased exposure of the patients to unit shifts in which staffing by registered nurses (RNs) was 8 or more hours below the target level. The hazard ratio was 1.02, 95% CI, 1.1-1.03 with a \(p\) value of <.001. The target RN hours for each unit and shift were decided upon by using an audited commercial patient-classification system. This study also found increased mortality was associated with patient exposure to unit turnover as well. Unit turnover was determined by the sum of unit admissions, transfers, and discharges (excluding death). There was a positive correlation found between increased mortality and high patient turnover as well (hazard ratio per high-turnover shift, 1.04; 95% CI, 1.02-1.06; \(P<0.001\)). These are the adjusted values in which patient characteristics and hospital units were accounted for as well (age, sex, payer, admission type, predicted morality based on the modified diagnosis related group, type of unit, type of service, number of ICU admissions per shift, and many other variables). Therefore, this shows that there is a true need to match patient staffing with patients’ needs according to nursing workload (Needleman et al., 2011).

The Nursing Activities Score (NAS), which will be implemented in this EBP project, can be considered not only a measure of nursing workload, but has been found to be associated with death and length of stay (Padilha, Cardoso de Sousa, Quijo, Mendes, & Miranda, 2008). High NAS (> 66.4%) was found to be associated with increased risk of death \((p\)-value of 0.006) and longer length of stay (LOS) \((p\)-value 0.015) (Padhila et al., 2007). Further information regarding the NAS tool will be discussed in Chapter 3.
When looking at patient satisfaction in relation to nurse: patient ratio, there is a correlation between workload and decreased patient satisfaction. Patients in hospitals with higher ratios of patients to nurses (or higher workload) were less likely to recommend their hospital (OR 0.95, 95% CI 0.92-0.97) (Aiken et al., 2012). This was after controlling for hospital characteristics such as teaching status, high technology, and bed size (Aiken et al., 2012).

Therefore, there is a clear need for determining proper nurse-patient ratios in relation to both nursing burnout and patient outcomes. This is supported by the Institute of Medicine (IOM) who issued a report as far back as 1996, in which it recognized the importance of determining appropriate nurse-patient ratios in order for patients to receive quality health care (Stanton & Rutherford, 2004).

Data from the Clinical Agency Supporting the Need for the Project

There is clear data supporting the need for the evidence based practice project. The project will take place in a 26-bed Medical Progressive Care Unit (MPCU) in an urban tertiary-referral academic health center. Given that it is a tertiary care center, the patients tend to be of high medical acuity. Many of these patients would be in an Intensive Care Unit (ICU) in any other hospital throughout the state, and indeed, are sometimes even direct admits from an outside ICU. Given the high workload associated with the medical acuity, there have been a total of 20 nurses who have left the MPCU in the past 18 months. This is a fairly large number considering there are currently approximately 36 nurses on this unit, if excluding those currently on orientation. This is why 3 beds have been closed due to staffing reasons since late October 2014 (Director Clinical Operations, Critical Care Services, personal communication, July 17, 2015).

In terms of patient turnover data, as discussed previously (admissions, discharges, and transfers), the daily estimated churn rate (admissions, discharges, and transfers) is 11.08 for the current Year to Date (YTD) (Director Clinical Operations, Critical Care Services, personal communication, July 17, 2015). This is a very high number and troubling when looking at the
data in regards to high unit turnover by Needleman et al. (2011). This raises concern that the patients are at increased risk for mortality due to the high churn rate.

In terms of calculating nurse to patient ratios, one must also take into consideration traveling off the unit. During the time nurses are away from the unit, this could be considered increasing the nurse to patient ratio. Currently, the unit averages approximately 12 travels per day (Director Clinical Operations, Critical Care Services, personal communication, July 17, 2015). Given that the nurses have to travel with their patients in a MPCU (Medical Progressive Care Unit), this could be considered as increasing the nurse: patient ratio from 1:3 to 1:5 during this time, which is clearly unsafe (Director Clinical Operations, Critical Care Services, personal communication, July 17, 2015).

Apache III is a validated and reliable prognostic system that has been used to predict hospital mortality for critically ill patients (Knaus et al., 1991). When looking at a five day glance of Apache III scores from both the MPCU and the Medical Intensive Care Unit (MICU), the scores support the need for appropriate nurse: patient ratios and consideration of nursing workload (Director Clinical Operations, Critical Care Services, personal communication, July 17, 2015). The scores for the MPCU ranged from 7-99 with a median of 55 (Director Clinical Operations, Critical Care Services, personal communication, July 17, 2015). The MICU APACHE III scores ranged from 14-97 with a median score of 46 (Director Clinical Operations, Critical Care Services, personal communication, July 17, 2015). This indicates that the MPCU patients are actually at higher risk for hospital mortality and meet approximate ICU level scores. Overall, there is significant support for a much-needed change in regards to staffing in order to try and decrease nurse turnover and burnout.

**Purpose of the EBP Project**

The purpose of this EBP project was to help decrease burnout among MPCU nurses by using a nursing workload tool as a guide for proper placement of patients according to nursing workload. Additionally, it was anticipated that by increasing physician awareness of nursing
workload, there might be an increased understanding regarding nursing workload and how workloads can positively or negatively affect patient outcomes.

While a current proposal is underway to help improve nursing satisfaction, it will be a long time before the increase in nurses can have an effect on the current situation in the MPCU. The hope is that by increasing awareness of workload and implementing a guide for patients according to nursing workload, there will be a more immediate decrease in nurse burnout on the unit. The data that was collected in this EBP project can also be used to help support the current proposal that is being looked at by the Chief Nursing Officer (CNO) and Chief Operating Officer (COO) in this organization.

**Identifying the compelling clinical question**

The compelling clinical question to be answered by this EBP project was: For registered nurses on a Medical Progressive Care Unit (MPCU) at a large urban hospital, will increased physician awareness of nursing workload, as well as implementation of a nursing workload tool \[\text{Nursing Activities Score (NAS)}\] as a guide for correct placement of patients help reduce nursing burnout over a three-month period?

**PICOT format**

The compelling clinical question was developed using PICOT question format in order to define the key components of the EBP project. The PICOT format is as follows: (P) Population of interest, (I) the intervention of interest or issue of interest, (C) the comparison or issue of interest, (O) outcome of interest, and (T) time involved to demonstrate an outcome (Melynk & Fineout-Overholt, 2011).

P-The population of interest for this EBP project was registered nurses who worked as staff nurses on a medical progressive care unit.

I-The intervention of interest is increased physician awareness of nursing workload and the implementation of a nursing workload tool \[\text{Nursing Activities Score (NAS)}\] as a guide for proper placement of patients according to nursing workload scores work to decrease burnout.
The comparison of interest was burnout scores prior to intervention or the baseline burnout scores prior to implementation of the nursing workload tool (NAS).

The outcome of interest was the reduction of nursing burnout scores according to the Maslach burnout inventory.

The timeframe for this EBP project was a three-month period from fall 2015 to winter 2016.

Significance of the EBP Project

Progressive care units fall in between medical-surgical floors and intensive care units in terms of patient acuity. This leaves them in a grey area in which it can be difficult to determine where a patient appropriately belongs. Progressive care unit patients are supposed to be moderately stable with less complexity, need only moderate resources, and only require intermittent nursing vigilance [American Association of Critical Care Nurses (AACN), 2015]. The patients can also be currently stable, but with high potential for becoming unstable (AACN, 2015). Clearly these statements by the AACN leave a lot of room for interpretation.

The data in regards to turnover and APACHE scores on the MPCU clearly support the need for immediate changes to take place in order to help overloaded nurses. The significance of this project is to not only help the MPCU nurses in acquiring data to support much needed change, but to also increase physician awareness in regards to the effects of unsafe nurse workloads on both the nurse and their patients. In this current healthcare world that we are working in, collaboration is a key component in ensuring that patients receive safe, cost-effective healthcare. By increasing physician understanding regarding nursing workload, the benefits of collaboration and understanding could last during the entire physicians’ career. Decreasing burnout amongst nurses should ensure that patients’ are provided safe and quality health care (Cimotti et al., 2012). By decreasing burnout, there may also be an increased health benefit to the nurses (Flynn et al., 2009). This EBP project provides additional knowledge to
what is already known about nursing burnout and nursing workload. It will also add to the limited knowledge or data in regards to progressive care units and their workloads.
CHAPTER 2
THEORETICAL FRAMEWORK AND REVIEW OF LITERATURE

This EBP project addressed the clinical question: For registered nurses on a Medical Progressive Care Unit (MPCU) in a large urban hospital, will increased physician awareness of nursing workload and implementation of a nursing workload scoring system to be utilized as a guide for correct placement of patients help to reduce burnout over a three-month period? Within this project, a guiding nursing theory and an EBP framework were utilized to help provide solid groundwork for the educational component and to help successfully implement the project.

Theoretical Framework: Theory of Structural Empowerment

The theory that was used in this project is Rosabeth Kanter’s Theory of Structural Power. Kanter’s theory is based on the idea that job empowerment has a direct effect on the efficiency of an individual in their job and their ability to accomplish their goals (Laschinger, 1996; Miller, Goddard, & Laschinger, 2001). This in turn, affects the individual’s organizational commitment, job satisfaction, and levels of burnout (Laschinger, 1996; Miller, et al., 2001).

Given that Kanter’s theory specifically addresses burnout is what makes it an applicable theory for a Doctorate of Nursing Practice (DNP) project on burnout (Laschinger, 1996; Miller, et al., 2011). Kanter’s theory is based on the idea that individual work behaviors are responses to work conditions and situations, not manifestations of personality traits (Laschinger, 1996). Within this theory, there are two sources of systemic power: formal and informal power (Laschinger, 1996; Miller, et al., 2001).

Formal power is found in jobs that are visible and central to the purpose of the organization (Miller, et al., 2001). These jobs also allow for flexibility in decision-making within the organization (Laschinger, 1996). In addition to high profile job activities, individuals will derive power from the alliances they are able to form within the organization with their superiors, peers, and subordinates (Miller, et al., 2001). The individuals also derive power from alliances
that are formed with their connections outside the organization (Laschinger, 1996). All of these alliances are considered informal power (Laschinger, 1996; Miller, et al., 2001). An individual with a high amount of formal and informal power at their fingertips is thought to have increased access to both opportunity and power through the organizational structure (Laschinger, 1996; Miller et al., 2001). Due to formal and informal power, an individual is productive at work due to feeling empowered (Laschinger, 1996; Miller et al., 2001).

Within this theoretical framework or theory, Kanter’s theory also described three organizational structures that affect work behaviors in organizations: power, opportunity, and proportions (Laschinger, 1996; Miller, et al., 2001). Proportions refer to the social composition of the individuals’ fellow employees such as race or sex (Miller, et al., 2001). According to Kanter, the structure of power involves three organizational sources of power: access to lines of information, support, and resources (Laschinger, 1996). Kanter theorized that when individuals do not have access to information, support, resources, and opportunity for advancement, they feel powerless (Laschinger, 1996). While individuals with access to power and opportunity for advancement feel highly motivated and are able to contribute to the development of the empowering environment by sharing their sources of power (Laschinger, 1996; Miller et al., 2001).

The accomplishments that are achieved by individuals in an empowering working environment, in turn, reflect the commitment that individuals have to their organizations (Laschinger, 1995). An individual's accomplishments also affect the degree of job satisfaction and level of burnout (Laschinger, 1996). The extent of control that individuals feel that they have over conditions of their work is an important influencing factor in work effectiveness (Laschinger, 1996). These influencing factors have actually been linked to an individual's health and well being by a variety of researchers (Laschinger, 1996). Kanter believes that access to information, support, and learning opportunities are actually more influential to an individual's attitudes and behaviors than their personality traits (Laschinger & Wong, 1999; Faulkner & Laschinger, 2008).
Kanter’s empowerment theory has been utilized in many nursing and non-nursing fields to demonstrate that empowering work environments are related to an individual’s feelings of increased autonomy and organizational commitment (Nedd, 2006). Several nursing and non-nursing studies have shown links between Kanter’s concept of empowerment to organizational outcomes such as job autonomy, job satisfaction, and decreased levels of nursing burnout (Laschinger & Finegan, 2005). Specifically, Laschinger & Finnegan (2005) used Kanter’s theory to show that structural empowerment had a direct effect on respect and organizational trust. Empowerment was also found to have an indirect effect on job satisfaction and organizational commitment (Laschinger & Finegan, 2005).

Laschinger (1996) found a significant correlation between overall job empowerment and emotional exhaustion ($r=-.34$, $p<.01$), depersonalization ($r=-.28$, $p<.05$), and personal accomplishment ($r=.36$, $p<.01$). Emotional exhaustion and depersonalization are considered measures in aspects of burnout. Moderate to weak correlations were found between opportunity, support, resources, and all burnout scales (range of correlations .23-.52, $p<.05$) (Laschinger, 1996).

**Theoretical summary for EBP project**

Kanter’s Theory of Structural Power in Organizations is directly applicable to this EBP project because the project has investigated nursing burnout. By giving nursing a voice in regards to patient workload by using an objective workload instrument, allows nurses’ to validate when a person is not at an appropriate level of care on the unit and the ability to transfer the patient to an appropriate level of care. The validation in regards to appropriate level of care increases nurses’ feelings of empowerment. This feeling of empowerment, according to the theory, should ultimately decrease emotional exhaustion and burnout scores.

**EBP Model for implementation:**

EBP models are utilized to successfully implement a change in practice. The EBP model that was chosen for implementation of this project was the Stetler model. The Stetler model was
first developed in 1976 when the concept of research utilization was emerging in nursing (Stetler, 2001). It was updated in the 1990s when EBP began to be utilized. It is a five-phase process that can be used to organize a research utilization process as it guides the practitioner in how to answer a question using research literature (Romp & Kiehl, 2009). The model provides a way to think about the association between research use and evidence-based practice (National Collaborating Centre for Methods and Tools [NCCMT], 2011). It also provides an opportunity to look at how to use evidence to make formal changes within an organization (NCCMT, 2011). Finally, the model looks at how individuals can apply research on an informal basis as a part of their critical thinking and reflective practice (NCCMT, 2011). The Stetler Model is useful for practitioners who are given the task of developing common standards, tools, and/or policies (NCCMT, 2011). The model was utilized in this project with the goal of implementing the use of the NAS instrument in developing common standards regarding nursing workload with appropriate transfer to an increased level of care when needed.

The model is based on the following six assumptions: 1) the formal organization may or may not be involved in an individual’s use of research or other evidence; 2) utilization may be instrumental, conceptual, and/or symbolic; 3) other types of evidence and/or non-research-related information are likely to be combined with research findings in order to facilitate decision-making or problem-solving; 4) internal and external factors can influence an individual’s or group’s view and use of evidence; 5) research and evaluation provide us with probabilistic information, not absolutes; 6) lack of knowledge and skills pertaining to research utilization and EBP can inhibit appropriate and effective use (Stetler, 2001, p. 274). Along with the aforementioned six assumptions, the model consists of five phases: preparation, validation, comparative evaluation and decision-making, translation and application, and the final phase of evaluation (Stetler, 2001).
Preparation

The purpose of the first phase of preparation is to search, sort, and select sources of research evidence (Stetler, 2001). First, there is consideration of influential factors in phase I. There must be affirmation of the priority, the need for the research, as well as defining the purpose and outcomes by the issue or problem (Stetler, 2001). It is essentially identifying the problem and performing an initial literature search (Romp & Kiehl, 2009).

Validation

The object of the second phase is to perform a utilization-focused critique and synopsis (Stetler, 2001). Within phase two of validation, there is identification and recording of key study details and qualifiers if applicable (Stetler, 2001). At this point, if there is not enough evidence or the problem lacks sufficient evidence to move forward, the phase stops at this point (Stetler, 2001). Summarized, phase two is about critiquing the literature with utilization in mind (Romp & Kiehl, 2009). If there isn’t enough evidence to proceed forward, the project can stop (Romp & Kiehl, 2009).

Comparative Evaluation and Decision-making

The third phase of comparative evaluation and decision-making involves synthesizing findings and evaluating the findings by identified criteria (Stetler, 2001). The identified criteria can include such things as the fit of setting, feasibility, and current practice, along with substantiating the evidence (Stetler, 2001). Within this phase, there is organization and the displaying of similarities and differences among multiple findings (Stetler, 2001). There should also be a decision or not on whether or not to use such findings based on the identified criteria and strength of evidence (Stetler, 2001). In other words, phase three is about evaluating the findings to see if they are desirable and feasible to practice, along with considering the risks involved, the resources needed, and the readiness of the staff for the project (Romp & Kiehl, 2009).
Translation and Application

Phase four involves confirming the type of research, method, and level of use (Stetler, 2001). It also includes identifying whether the translation or use goes beyond the actual findings or evidence, and if it is appropriate to have some variation in certain cases (Stetler, 2001). Phase four also looks at planning formal dissemination and change strategies (Stetler, 2001). In other words, phase four is translating and implementing the results into practice (Romp & Kiehl, 2009). If the translation shows positive outcomes, there may be development of plans for formal organizational change (Stetler, 2001). A component of the formal change may be evaluation; therefore the phase four and five may become blurred together (Stetler, 2001).

Evaluation

The fifth and final phase consists of 1) clarifying expected outcomes, 2) differentiating between formal and informal evaluation of applying the findings into practice, 3) considering the cost-benefit of the different evaluations, and 4) looking at the two types of evaluation data which are formative and summative (Stetler, 2001). Formative data is essentially whether the findings are being used as intended. Summative data is looking at whether outcomes or goals have been met (Stetler, 2001). Overall, phase five is evaluating the findings and evaluating whether the goals have been met.

Application of the EBP model to Project

The five phases of the Stetler Model were applied to the DNP EBP project. The first phase (preparation phase) involved identifying a tentative PICOT (Population, Intervention, Comparison, Outcome, and Time) question (Stetler, 2001). The tentative population was identified [Medical Progressive Care Unit (MPCU) nurses] as well as the tentative outcome of interest (nurse burnout) for the preliminary literature review. Due to the unit being part of a tertiary referral center, many of the nurses felt like they were taking care of too many patients that belonged in an Intensive Care Unit (ICU). This high workload due to inappropriate level of care was leading to the nurses feeling physically and emotionally exhausted. Exhaustion was
leading to high turnover and job dissatisfaction within the nursing unit. In the preparation phase of the project, use of the NAS was identified as a possible intervention with the main intervention being transfer of patients to a higher level of care. After a preliminary literature search took place, the Nursing Activities Score (NAS) was chosen as a workload tool to help measure nursing workload. A subsequent literature search combined the ideas of workload, nursing and patient ratios, along with nurse staffing, as the goal of the project was to transfer to appropriate staffing levels according to nurse workload. These keywords were combined with the outcome of burnout to complete the search. The second phase of validation of the research began with the results from the search.

The second phase (validation) involves critiquing the chosen literature with utilization in mind (Romp & Kiehl, 2009). While many articles were originally identified, a finalized number of nine articles were chosen after they were analyzed and critiqued by John Hopkins Evidence Based Practice Appraisal in regards to whether they looked at nurse staffing and burnout, along with the adequacy of the sample size. Many of the other articles regarding workload and burnout were removed due to not involving the United States (US) as part of their data collection. Articles that did not involve the US then became part of the exclusion criteria.

The third phase (comparative evaluation/decision making) involved the researcher evaluating the findings for desirability and feasibility (Stetler, 2001). Given that there was a definite link in the research found between nursing workload and burnout as well as managerial and individual nursing support on the MPCU for this project, the decision was made to proceed to phase four. Risks were looked at and discussed. Risks included increasing workload by addition of the tool and increasing frustration if the patients did not move according to nursing workload. After an informal discussion was held with the nursing staff regarding the tool, it was determined that the instruments benefits outweighed the risks.

Phase four (translation and application phase) obviously involved translating the evidence into a plan and implementing it (Romp & Kiehl, 2009). The consideration was made to
implement the nursing workload tool, which is identified as the Nursing Activities Score (NAS). The NAS is a validated tool for measuring nursing workload in the ICU. Currently, there is no measure of nursing workload and decision to transfer patients is based solely on physician discretion.

The NAS was implemented into daily practice in the MPCU as a guide for proper placement of patients according to nursing workload. Included with translation and application of the plan was the education of physicians regarding nursing workload and the NAS. This education helped to integrate the implementation of the NAS as a guide for proper transfer of patients. Given that phase four includes identifying whether the translation or use goes beyond the actual findings or evidence, and the appropriateness of variation in certain cases, consideration for variation took place as well (Stetler, 2001). One variation that was identified prior to implementation was that a pulmonary consult would be implemented, if appropriate, if the patient was unable to be moved according to their NAS workload score. The actual score for criteria was also identified as a possible variation or needed change that may be needed once the project was evaluated. This was a consideration due to the score being the median score regarding ICU workload and not the lowest level of acceptable score for ICU workload. Therefore, given that the unit was a progressive care unit, a new cutoff score for the MPCU was considered. Yet another variation in regards to the project was that if nurses felt the NAS score was too burdensome or that the collection of the NAS interfered with patient care and impaired safety due to taking time away from the patient. In this case, the NAS would only be scored when the nurse felt the patient may be appropriate to transfer to the ICU due to medical instability in order to help make the decision in regards to transfer. This score would then provide extra data to help support the rapid response and MPCU nurses in their push to transfer to the ICU. It was decided that the variations in the project would only take place if deemed absolutely necessary in order to make the project a success. The final part of the application
IMPLEMENTATION OF A NURSING WORKLOAD TOOL

Phase involved implementing the NAS tool daily on each patient in the MPCU as a guide for transfer according to nursing workload.

Phase five (evaluation) involves use of formal and informal evaluation of applying the findings into practice (Stetler, 2001). The formal evaluation used for the EBP project was the Maslach burnout tool. This was used as a precursor to the project and then at the end to measure any change in nursing burnout scores after implementation of the EBP project. Informal evaluation was nursing and physician feedback regarding the use of the NAS. The EBP results were also evaluated to determine whether it was appropriate to implement the NAS into practice or whether physicians would continue to benefit from increased knowledge regarding nursing workload and the effect that inappropriate workloads has on their patients.

**Model Summary for EBP Project**

The Stetler Model is appropriate for use in the EBP project as it is appropriate for facilitation regarding change of practice in a healthcare facility. The model allowed for each phase of the project to be assessed as well as for taking into account considerations that may need to take place with the project. It ensured that implementation of evidence-based practice process was successful with smooth employment of each phase in the EBP project.

**Literature Search**

With the problem of burnout and improper nursing workload for a MPCU in mind, a comprehensive literature search was undertaken in order to find the best evidence between nursing workload and burnout. The following sections describe how the sources were selected, how the evidence was examined, and how the evidence answered the clinical question.

**Search Engines and Key Words**

A broad literature search was conducted in order to find the link between nursing burnout and nursing workload. Databases that were included in the search were: Cumulative Index to Nursing and Allied Health Literature (CINAHL), ProQuest, Medline, Cochrane,
PsycInfo, Joanna Briggs Institute (JBI), and WebScience. Within the different search engines, key words that were utilized in each search were “nurs* burnout” AND “nurs* staff*” OR “nurs* workload” OR “nurse-patient ratio”. The preliminary search for Cinahl revealed 26 articles, Medline revealed 46, PsycINFO revealed 8, Cochrane resulted in 0 articles, ProQuest had 396, WebScience resulted in 18 and JBI had 1 article. After articles were finalized, a hand search of references from articles that were utilized for the project revealed an additional four articles.

**Inclusion and Exclusion Criteria**

Inclusion criteria for the search were English language, scholarly journals, peer reviewed, and years from 2005-2015 for the search engine. With citation chasing, articles from 2000 to 2015 were allowed. Within each database, a preliminary screening was done by title. If the title appeared to be applicable to the study, then the abstract was reviewed. Out of the search engines, eighteen articles appeared to be applicable to the study. Exclusion criteria were made to remove any articles that did not involve research from the United States. This exclusion criterion was implemented due to concern that other countries’ hospital and healthcare systems would be too different to be directly applicable to the project and weaken the evidence. Articles were also excluded if their research did not appear to include any research on the link between staffing and nurse burnout. After this was applied, six articles were chosen from the search engines. With citation chasing an additional four articles were chosen for the project. One article was chosen from Medline, two were from Cinahl, and one was found in both Medline and PsycINFO. Another article was found in both PsychINFO and ProQuest and the last article was from JBI.

**Levels of Evidence**

Melynk & Fineout-Overholt’s (2011) hierarchy of evidence was chosen to help critique the articles chosen for the project. Level I evidence is made up of systematic reviews or meta-analysis of randomized control trials (RCT). Level II evidence is a well-designed single RCT. Level III is made up of a well-controlled trial that is non-randomized. Level IV is made up of
single case-control studies and cohort studies. Level V evidence is systematic reviews of
descriptive or qualitative studies. Level VI evidence is single descriptive or qualitative studies.
Levels VII are results from expert opinions or authorities on the subject (Melynk & Fineout-
Overholt, 2011).

Appraisal of Relevant Evidence

As stated above, a final ten articles were chosen as evidence for the EBP project. Given
the sensitive nature of nursing burnout and the inability to knowingly include an intervention that
may increase burnout or nursing workload, only level V or VI evidence was found. One article
was from JBI, which was a systematic review, and the other articles were Level VI evidence
according to Melynk & Fineout-Overholt (2010). The Level VI evidence was individually
critiqued using John Hopkins Evidence-Based Practice Research (JHNEBP) Evidence Appraisal
tool while the systematic review was critiqued using the JHNEBP Non-Research Evidence
Appraisal tool.

Level V Evidence

The systematic review with Level V evidence included 1 systematic review article, 1
cohort study, and 38 correlational, descriptive studies. The aim of the study was to examine the
impact that nursing workload and staffing had on creating and maintaining a health work
environment. A healthy work environment in this review was defined as, “a practice setting that
maximized health and well-being of nurses, quality outcomes and organizational performance,”
(Pearson, et al., 2006, p. 1). Pearson’s objectives were clearly stated in the review. The
objectives were to determine the impact of: “patient characteristics, nurse characteristics,
system characteristics and system processes on workload, scheduling and concepts of
productivity and utilization, workload, scheduling and concepts of productivity and utilization on
the quality of outcomes for clients, nurses, and system/organization” (Pearson, et al., 2006, p.
1). The search strategy in the systematic review is specific, reproducible with clearly identified
search terms and search engines. It was also extensive enough to include pertinent studies.
The search for the systematic review included published and unpublished studies and papers that were written in the English language. A limited search of MEDLINE and CINAHL was performed to identify search terms, as well as an analysis of the text words that were contained in titles and abstract as well. The search also included the index terms that were used to describe the articles. A second search was then performed using all keywords and index terms. A third step then consisted of a search of all reference lists of all identified reports and articles for additional studies. A total of 12 databases were searched for this review. Therefore, the systematic review had an extensive search to find pertinent information. This is an important step in ensuring the quality the systematic review. Selection criteria was also identified which included research papers that looked at the appropriateness and effectiveness of workload and staffing concepts in fostering healthy environment in healthcare.

Of the 2162 papers that were identified, 171 were selected and then independently reviewed by two reviewers to ensure quality. Inclusion criteria that were considered included: meta-analysis, randomized controlled trials (RCTs), quasi-randomized controlled trials, cohort studies, case-control studies, and finally, descriptive and correlational studies. It also included all participants that were involved or affected by workload and staffing concepts within the nursing workforce and healthcare environment. System and policy issues were also considered. The review also looked at all workload and staffing strategies that impact the work environment with patient and nurse outcomes. Outcomes of interest were categorized into four groups: nursing staff outcomes, patient outcomes, organizational outcomes and system outcomes. No clear exclusion criteria were identified which does detract from the quality of the study. The articles results were then divided up into different components or sections with related data combined. This improves the quality of the review, as well as the fact that the included studies were clearly identified according to the type of article.

The first section looked at the relationship between nurse, patient, or organizational characteristics and nursing workload. One study found that increased severity of illness was
significantly associated with all of the sections of the nursing workload including bathing and dressing, mobility, elimination, feeding, medications, dressing and treatments, special needs, and behavior/mental status. The findings also indicated that age alone does not have a significant on nursing workload, but level of nursing workload was found to be associated with the severity of illness of the patient. This conclusion was rated a level 3c in accordance with JBI’s levels of evidence.

The second section of the review looked at the relationship between workload and staffing and the quality of outcomes for clients, nurses, and the system/organization. Two papers looked at satisfaction of the nurse according to workload, but only one study found a significant relationship between satisfaction and nursing workload (Level 4 evidence). All of the studies found a significant relationship between nursing workload and mortality as well as failure-to-rescue (Level 3c). A statistically significant relationship between nursing workload and patient safety was also found (Level 3c). There was also a correlation found between nursing workload and respiratory tract infections (Level 3c). Two studies reported conflicting results between nursing workload and emotional exhaustion. There was not a significant relationship found between pressure ulcers, UTI rates, and patient complaints.

A retrospective analysis of hospital ICU discharge data found that patients that were cared for on units with medium staffing intensity (1:3 or greater on day or night shift but not both) were more likely to have cardiac or other complications that patients cared for in an ICU with high staffing intensity (1:2 or fewer on day or night shift). Patients that were cared for in low staffing intensity ICUs (1:3 or greater on day and night shifts) were more likely to experience cardiac and other types of complications than those cared for in an ICU with high-intensity staffing. In one study, an identified association was found with adjusted mortality with peak occupancy and ratio of occupied to appropriately staffed beds. Patients in this study had a 4% increase of mortality when they were exposed to a high workload when compared with a moderate workload. Another study found a significant relationship between the total number of
total number of nursing staff and the quality of care index. Therefore, the final conclusion was that high nursing workload is significantly related a decrease in the quality of care (Level 3c).

In studies on nurses and perceptions of nursing workload, increased patient-nurse ratios significantly correlated with increased workload. In groups where patient-nurse ratio increased after restructuring of an organization, there were reports of decreases in psychological health in three of the four measured variables. Nursing staff that experienced increased patient-nurse ratios reported decreases in job satisfaction and a greater intention to quit (Level 3c). This study also found that there was not a significant relationship with call-ins or absenteeism with increased ratios. Increased patient-nurse ratios were also found to be associated with lower levels of hospital functioning and effectiveness with more errors/injuries; lower quality of care; and fewer benefits were found from restructuring and downsizing (Level 3c). Low negative correlations were found between nurse-to-patient ratios and hierarchical organizational structures and attitudes to care provision, which was thought to suggest that when nurse-to-patient ratios decrease, hierarchical practice actually increases (Level 3c). Positive relationships were found between nurse-patient ratios and nurses’ perceptions of their ability to cope with their workload, job satisfaction, and collaboration with other healthcare professionals (Level 3c). When more nurses were available, work environments were viewed more positively.

Given that the project looked at nursing workload and burnout and not at the various levels of nursing, the results on the relationship between clinical skill mix (registered nurses, licensed nurses, nursing assistants) will not be discussed but the overall results can be found in Appendix A in the Summary of Appraised Literature. The results on shift patterns and their effect on staff commitment will also not be discussed and the general results of the review can be found in Appendix A.

The review recommended that based on the evidence, healthcare organizations that are looking to establish and maintain a healthy work environment should consider taking into account the patients’ severity of illness when considering staffing and workload issues.
and that the relationship between the hours and proportions of RNs and patient outcomes [falls, pneumonia, pressure ulcers, length of stay (LOS)], and postop infection rates should be noted when determining workload and scheduling of nurses (Level 3c). The review also recommends that organizations should think about the limited evidence that indicates that there may be a relationship between higher-intensity staffing and lower incidences of failure-to-rescue and mortality. Organizations should also look at the fact that staffing appears to be associated with decreased job satisfaction, as well as the relationship between staff turnover and hierarchical approaches to decision-making (Level 3c). It also recommends that nurses be able to determine their shift allocations as it may increase their professional commitment (Level 3c). The review also concludes that if organizations are able to use less temporary nurses, there appears to be an improvement in nurses’ perceptions of standards of care (Level 3c).

Overall, this was a good quality systematic review that adds to the evidence of the relationship between nursing workload and burnout. One drawback of the review was that it didn’t actually go over potential limitations of the study.

**Level VI evidence**

The rest of the articles included in this EBP project are Level VI evidence according to Melynke & Fineout-Overholt (2011). Level VI evidence included in this project was made up of large studies. This helps to prove the overall quality of the evidence when looking at showing a link between nursing burnout and nursing workload. Specifically in this project, the evidence included in these papers will look specifically at data from the US, as this was part of the criteria that was identified in Phase 2 and 3 of the Stetler Model.

The first article was a study by Aiken et al. (2011) that looked at the link between work environments on hospital outcomes. Survey data between 1999 and 2009 of 98,116 bedside nurses that were practicing in 1,406 hospitals across 9 countries was collected which can be considered a more than adequate and appropriate sample size. The participants included in the study were randomized in the United States (US). This improves the results of the study when
looking specifically at the US. The specific purpose was to “determine the effect of hospital work environments on hospital outcomes across multiple countries,” (Aiken, et al., 2011, p. 1). The main outcomes were also clearly identified which were to look at nurse burnout and job dissatisfaction, along with patient readiness for hospital discharge and quality of care. Given the sensitivity of the study of nurse burnout, there was no clear intervention or control group, which does weaken the study, which is why it is Level VI evidence (Aiken, et al., 2011).

There is a very clear description of the data collections that were utilized in this study. The main measurement used for the study was the 28-item Practice Environment Scale (PES) of the Nursing Work Index (NWI), which is a tool that has been validated in the USA and many other countries. The 5 subscales in the PES-NWI include (a) staffing-resource adequacy, which includes 4 items, (b) nurse manager ability and leadership, which also includes 4 items, (c) nurse-physician relation relations, which includes 3 items, (d) nurse participation in hospital affairs, which is made up of 8 items, and (e) nursing foundations for quality of care which is made up of nine items. Nurses were asked to indicate the extent to which they agreed that each feature was present in their current job on a 4-point scale. The scale ranged from strongly disagrees, which was coded as a 1, to strongly agree which was coded as a 4. The mean score for all items in every subscale was calculated for each nurse and then averaged across all nurses reporting from each hospital. The reliability for each coefficient according to Cronbach’s alpha for all subscales in the US exceeded 0.70. A summary work environment measure was constructed by counting the number of subscales on which each hospital scored above the median in each country. Hospitals in each country with scores below that country’s median on 4 or 5 subscales were categorized as having “poor” work environments. Hospitals that were above average on 4 or 5 subscales were considered to have “better” environments. While hospitals with “mixed” work environments had 2 or 3 subscales that were above average.

Nurse burnout in this study was measured using the Maslach Burnout Inventory, which is a validated standardized tool. Nurses with a total score of 27 or above on this 9 item subscale
were considered to have high burnout. Nurse dissatisfaction was measured by distinguishing nurses who reported being very “dissatisfied” or “moderately dissatisfied” with nurses who were somewhat “satisfied” or “very satisfied” with their current jobs. Quality of care was measured by nurses’ assessments of whether they were “somewhat confident” or “not at all confident” as opposed to “very confident” that their patients were prepared to care for themselves at the time of discharge. It was also measured by how nurses rated their units over the past year as “fair” or “poor” or “good” or “excellent,” (Aiken et al., 2001).

The data collection for the United States included one-third to one-half of all registered nurses in four states. The nurses were randomly sampled from licensure lists. The included states were Pennsylvania (PA), California (CA), Florida (FL), and New Jersey (NJ). The USA study was originally conducted in the state of Pennsylvania in 1999 and then was replicated and expanded in four large states. The four states accounted for 25% hospitalizations in the country. While the fact that it included multiple states is a good thing, the fact that it was limited to only four states does detract from the applicability across all states. To improve applicability, one could consider that it included all hospitals in the aforementioned states, which does help the applicability of the results across different hospitals such as for-profit or non-profit hospitals (Aiken et al., 2011).

Again, the results in this discussion will focus on the US due to concern for applicability of results from other countries. In the US, 33% of nurses had high burnout, while 22% were dissatisfied with their current jobs. Nurse rated quality of care showed that 45% of nurses were not confident that patients were ready for discharge from the hospital; while 16% rated their quality of care in their unit as fair or poor. Burnout appeared to range from 15% in Germany as the lowest and as high as 60% in Thailand. Dissatisfaction scores ranged from 17% as the lowest in Germany and the highest was 60% in Japan. Lack of confidence in readiness for discharge was ranked as low as 19% and as high as 85% in Japan. Quality of care was ranked
as “fair” or “poor” reached the highest level at 68% in South Korea. Canada’s nurses at 11% ranked care as “fair” or “poor” (Aiken et al., 2011).

Staffing-resource adequacy on the NWI/PES scale in the US ranged from 1.6-3.6 with a median of 2.5. Nurse manager ability and leadership ranged from 1.7-3.6 with a range of 2.6. Nurse-physician relations ranged from 2.2-3.8 with a median of 2.9. Nurse participation in hospital affairs ranged from 1.7-3.5 with a median of 2.6. Foundation for quality of care ranged from 2.2-3.6 with a median of 3. For total overall classification of work environment, 269 hospitals had poor scores with a score of 0 or 1 NWI-PES score above the national median, 210 ranked as mixed with 2 or 3 scores above the national median, while 283 hospitals were ranked as better with 4 or 5 scores above the national median (Aiken et al., 2011).

Aiken et al. (2011) then looked at the nurses in different work environment and the percentage of nurses reporting negative outcomes according to nurse burnout, job dissatisfaction, and quality of unit as poor or fair, as well as nurses lacking confidence in their patients being prepared for discharge. Specifically in the United States (US), 39.6% of nurses reported high burnout in a “poor” work environment, 35% of nurses were burnt out in a “mixed” environment and 27.5% in a “better” work environment. For the effect of work environment on job dissatisfaction, 30.4% of nurses were dissatisfied in a “poor” work environment, 24.7% were dissatisfied in a “mixed” environment, and only 15.9% were dissatisfied in a “better” work environment. In terms of nurses being not confident that their patients were prepared for discharge, 54.1% of nurses in a “poor” work environment were not confident, while only 45.8% in a mixed environment and 39.5% in a “better” work environment felt this way. In a “poor” work environment, 24.1% rated their quality of unit as poor, while 16.2% in a “mixed” work environment felt this way, and only 9.6% of nurses in a “better” environment felt their quality of unit was poor or fair (Aiken et al., 2011).

For the next step with the data, Aiken et al. used logistic regression models to estimate the effect of the work environment on burnout, job dissatisfaction, and decreased confidence in
readiness for discharge, as well as low unit quality. The data was fitted separately for each
country along with controlling for differences across hospitals in nurse characteristics that may
affect reporting. This helps to increase the validity of the results. In the US, when looking at a
“mixed” vs. “poor” work environment, the odds ratio (OR) on a nurse reporting high burnout was
0.75 with a range from 0.71-0.78. For job dissatisfaction, the OR was 0.65 with a range from
0.62-0.68. For decreased confidence in discharge readiness, the OR was 0.74 with a range from
0.70-0.78, while the OR for a low quality unit was 0.59 with a range from 0.56-0.63. When
comparing a “better” vs. “poor” environment, the OR for high burnout was decreased to 0.56
with a range from 0.51-0.61. Job dissatisfaction OR decreased to 0.42 with a range from 0.38 to
0.46 and low confidence in discharge readiness OR decreased to 0.55 with a range from 0.49 to
0.61. Finally, a low quality unit fell to 0.35 with a range from 0.31 to 0.40 when comparing a
“better” work environment to a “poor” work environment (Aiken et al, 2011).

The overall conclusion was that hospitals with better work environments had lower
burnout, decreased likelihood of a nurse who was dissatisfied with their jobs, and who rated
their units as only fair or poor. Nurses in “better” work environments were also were more likely
to rate their patients as ready for discharge. The researchers indicated that these findings could
help hospital leaders in focusing on areas to decrease burnout, along with improving quality,
and safety of care. The areas to improve on could be increasing staffing, better nurse and
physician relationships, increasing nurse involvement in hospital decisions, and greater
managerial support for the bedside nurse (Aiken et al., 2011).

Unfortunately, Aiken et al. does not discuss the potential limitations of the study, which
is normally a mark of excellent studies. Therefore, this study is seen as a good study with
pertinent information, but most likely cannot be rated as an excellent study.

Another article by Aiken et al. (2010) looked at how the California nursing staffing
mandate affected nurse and patient outcomes. The objectives were clearly stated in this article.
The objectives were to determine whether nurse staffing in California hospitals, in which nurse-
to-patient ratios were mandated, differed from other states without legislation. It also looked at whether those effects were associated with nurse and patient outcomes. The research, like the other article, consisted of survey data from 2006 and included 22,336 hospital staff nurses who were working in 604 adult nonfederal acute care hospitals from CA (9,257 nurses from 353 hospitals), NJ (5,818 nurses from 73 hospitals), and PA (7,261 nurses from 178 hospitals). The researchers also retrieved patient outcome data from state hospital discharge databases. The surveys were sent to randomized nurses from licensure lists and the focus was on staff nurses. The surveys asked appropriate information on the nurses' environments for the research. This included the name of their employing hospital, their patient workloads, and the number of nurses and patients on their unit on their last shift. Aiken et al. then combined the responses by hospitals to create a hospital level measure, as well as a measure of hospital patient-to-nurse workloads by specialty, and other nurse-related outcomes in hospitals over 100 beds.

Aiken et al. then sent two survey mailings and a postcard that yielded a response rate of 35.4%. To evaluate for possible response bias, a shortened survey was sent to a random sample of non-responders. The response rate for the shortened survey with telephone reminders and a monetary incentive was 91%. Even though there were demographic differences in race/ethnicity, age, and experience between the responders and non-responders, there was no difference between the two in terms of workload measures and nurse-reported outcomes measures. Therefore, Aiken et al. then proceeded further with the study with only using the first responders' survey data.

All staff nurses' patient/nurse workload or patients assigned per nurse in CA was calculated at 4.1, NJ was 5.4, and PA was 5.4. When broken down by units, medical-surgical floors were calculated in CA as 4.8, 6.8 in NJ, and 6.5 in PA. Intensive Care Units (ICUs) were measured as 2.1 in CA, 2.5 in NJ, and 4.4 in PA. Telemetry floors were calculated at 4.5 in California, 5.9 in NJ, and 5.7 in PA. Oncology floors were calculated at 4.6 in CA, 6.3 in NJ, and 5.7 in PA. When looking at a medical-surgical floor, 88% of nurses in CA care for 5 patients or
less. In NJ, only 19% cared for 5 patients or less and 33% of PA nurses cared for 5 patients or less. When looking at an ICU, 85% of nurses cared for 2 patients or less in CA, while in NJ, only 63% of nurses did. In PA, only 71% did. On an oncology floor, 90% of nurses in CA cared for 5 patients or less, this number dropped to 29% in NJ and 55% in PA (Aiken et al., 2010).

When looking at practice environment characteristics, 73% of nurses in CA thought they had a reasonable workload, while in NJ only 59% of nurses did. In PA, only 61% thought their workload was reasonable. When looking at whether adequate support services allowed nurses to spend time with patients, 66% of nurses in CA agreed, while in NJ only 53% agreed, and in PA, 55% agreed. When looking at whether nurses thought there was enough registered nurses on staff to provide quality care, 58% in CA agreed, 41% in NJ agreed, and 44% in PA agreed. In CA, 74% of nurses had 30-minute breaks during the workday, while only 51% in NJ, and only 45% in PA did. In CA, only 33% of nurses’ thought that their workload caused them to miss changes in a patient condition, while 41% in NJ, and 37% in PA did (Aiken et al., 2010).

When looking at an odds ratio to indicate the effects on different nurse-reported outcomes of a 10% increase in nurses with workloads at or below the CA level, the OR for burnout higher than normal for all healthcare workers was 0.91 when controlling for hospital and nurse characteristics. The implied difference between hospitals at the 25th percentile (roughly 50% of nurses have workloads lower than the mandated levels) and 75th percentiles, (roughly 90% of nurses have workloads lower than the mandated levels) was 1.5 (Aiken et al., 2010).

Aiken et al. (2010) then calculated the OR of the effect of nurse staffing on 30-day inpatient mortality and failure to rescue by state. They used a logistic regression model to adjust for 132 patient characteristics including co-morbidities, age, gender, admission type, etc. They also adjusted for hospital bed size, teaching status, and technology. The adjusted OR for CA on 30-day inpatient mortality was 1.13 with a range from 1.07-1.20. On failure-to-rescue, the OR was 1.15 with a range from 1.09-1.21. In NJ, the adjusted inpatient mortality was 1.10, with a range from 1.01-1.22. The failure to rescue was 1.10 with a range from 1.01-1.21. In PA, the
OR for inpatient mortality was 1.06 with a range from 1.00-1.12. Failure-to-rescue numbers in PA were the exact same at 1.06 with a range from 1.00-1.12 (Aiken et al., 2010).

Aiken et al. estimated that if the average nurse-to-patient ratios in NJ and PA had been the same as CA, there would have been approximately 222 (222/1,598) fewer surgical deaths in NJ, and 264 (264/2,479) fewer surgical deaths in PA. The overall conclusion from the research was that improved nurse staffing is associated with better outcomes for both patients and nurses (Aiken et al., 2010). Unfortunately, there was no clear discussion of the limitations of the research, which may detract from overall conclusion of the article.

Aiken, Clarke, Sloane, Lake, & Cheney (2008) published an article whose objective was to analyze the effects of nurse practice environments on nurse and patient outcomes after accounting for nurse staffing and education. The survey data and hospital data is limited to Pennsylvania, but did include 168 out of the 210 adult acute care hospitals in PA in 1999. Inclusion criteria, while not clearly stated, appeared to be having hospitals that had 100 or more surgical discharges of the specific types that were under study by the PA Health Care Cost Containment Council, as well as having structural characteristics reported in the American Hospital Association Annual Survey or PA Department of Health Hospital Questionnaire. The hospitals also had to have sufficient nurse respondents to the survey. The survey sent to nurses was randomized to 50% of the nurses who were residing in and registered to work in PA. There was a 52% response rate from the nurses. Patient data looked at outcomes for 232,342 patients ranging from the age of 20 to 85 who underwent general surgical, orthopedic, or vascular procedures from April 1, 1998 to November 30, 1999 in the included 168 hospitals. The PES-NWI was used as well to measure the nurse practice environment, which is the same scale that was used in the article by Aiken et al. in 2011. Hospitals above the median on all 3 subscales were classified as “better,” whereas “mixed” was 1 or 2 subscales above the median, and “poor” was above the median on none of the subscales.
Total high burnout for the nurses surveyed was 4,364 nurses or 43.2%. In “poor” work environments, 1,127 nurses reported high burnout or 50.8%. In a mixed environment, 2,087 nurses or 44.3% reported “high” burnout. While in a “better” environment, 1,150 nurses reported high burnout or 36.3%. Job dissatisfaction overall was reported by 4,364 nurses or 43.2%. In a “poor” work environment, 1,053 nurses or 47.9% reported this. In a “mixed” environment, it was decreased to 44.1% of nurses for a total of 2,067 nurses. In a “better” work environment, it was decreased to 33.5% or 1,055 nurses. In terms of intent to leave, a total of 2,312 nurses reported intent to leave with a percentage of 23%. In a poor environment, this was 521 nurses or 23.5%. In a “mixed” environment, this was 24.2% nurses or 1,134 nurses. In a “better” work environment, this was decreased to 20.8% of nurses or a total of 657 nurses (Aiken et al., 2008). Nurse assessments of quality were also discussed in this study, but given that the focus is on nurse outcomes and not nurse reports of quality, this will not be discussed here. Nurse assessments of outcome on a larger scale was discussed and reported above in the article review by Aiken et al. (2011).

Aiken et al. (2008) performed a logistic regression model to show the results of the effects of “better” vs. “mixed” or “mixed” vs. “poor” environments on nurse outcomes with adjustments for nurse by sex, experience, education, and nursing staff. It also controlled for hospital characteristics by size, teaching, status and technology. If care environment and nurse staffing on burnout is estimated jointly, the effect of nurse staffing on burnout is an OR of 1.17 with a range from 1.09 to 1.25. If estimated separately, the effect of nurse staffing on burnout is 1.21 with a range of 1.11 to 1.31. If the care environment and nurse staffing are calculated jointly, the effect of care environment and nurse staffing on burnout is 0.76 with a range from 0.70 to 0.82. If calculated separately, the effect of the care environment on nurse burnout is 0.74 with a range from 0.68 to 0.80. When looking at job dissatisfaction, the effect of nurse staffing on job dissatisfaction when estimated jointly with care environment is 1.11 with a range of 1.04 to 1.18. If calculated separately, the effect of nurse staffing on job dissatisfaction is 1.15
with a range of 1.06 - 1.24. The effect of the care environment when calculated with nurse staffing is 0.75 with a range of 0.68-0.81. If calculated separately, the effect of the care environment is 0.74 with a range of 0.67-0.80. When looking at intent to leave within 1 year, the effect of nurse staffing, if estimated together with care environment, is 1.03 with a range of 0.95-1.12. If estimated separately, the effect of nurse staffing is 1.05 with a range of 0.96-1.14. If looking at care environment jointly with nurse staffing, the effect on intent to leave was 0.87 with a range of 0.79-0.96. If looking at it separately, it was 0.87 with a range of 0.78-0.96. When looking at the OR to indicate the effect of “better” vs. “mixed” or of “mixed” vs. “poor” care when taking into account the environment, nurse staffing, and nurse education on mortality, the OR of nurse staffing was 1.08 with a range of 1.03-1.13 (Aiken et al., 2008).

The overall conclusion that the researchers drew from the data was that nurse leaders have 3 major options for improving nurse retention and patient outcomes. The options were: 1) to improve RN staffing; 2) to move to a more educated workforce; 3) improve the care environment. In this article, there is no clear discussion of the potential limitations of this study, which is what brings this down from an excellent study to a good study. It still does have pertinent information that can help both nurses and their patients.

Another article by Aiken et al. (2012) looked at patient safety, satisfaction, and quality of care in 12 countries in Europe and the United States. The objective of this research was to determine whether hospitals with improved nurse staffing and work environments can affect patient care and nurse workforce stability in European countries. Data discussed from this article will be limited to the US to increase the applicability to the EBP project. The main outcome measures that were looked at included: hospital staffing, work environments, burnout, dissatisfaction, intent to leave job in the next year, patient safety, quality of care, and patient outcomes. The patient outcomes that were looked at included: satisfaction overall, satisfaction with nursing care, and willingness to recommend hospitals. The research design was a cross sectional survey of patients and nurses which deems it level VI evidence. The large number of
nurses and patients included in the survey does help to lend validity to the data or overall results (Aiken et al., 2012).

Within the US, 61,168 bedside nurses and more than 130,000 patients from 617 hospitals in CA, PA, NJ, and Florida (FL) took part in the survey. The hospital characteristics were obtained from the American Hospital Association annual survey. United States (US) satisfaction data was obtained from the Centers for Medicare and Medicaid Services’ hospital compare website; submission was voluntary by the US hospitals for the study and therefore data was only available for a subset of hospitals (Aiken et al., 2012).

Nurse response rates for the US were approximately 39%. A non-respondent survey data was then sent out to ensure that there was no response bias. No response bias was found. In the US, the nurses surveyed were across all unit types and were not limited to medical-surgical nurses. Patient data in the US was actually obtained after discharge. The main measures used for the research included the PES-NWI scale as a measure of the work environment. This is an internationally validated measure. Nurse burnout was the performed by utilizing the Maslach burnout inventory (Aiken et al., 2012).

The article included a clear section on potential limitations, which helps to improve the overall quality of the article. The limitations for the study were the fact that the study relied on cross-sectional data. Therefore causality could not be established definitively. Language barriers for the use of the measurements were also thought to have possibly affected the outcomes. The inability to link the nurse to the individual patients was also thought to be a limitation. Given the sampling in the US was broader than in Europe and the fact that the patient survey data was done after discharge, the interpretation of any differences between the US and Europe needed to be done with caution (Aiken et al., 2012).

The results for the US show that the effect of staffing on burnout is an OR 1.12 with a range of 1.12-1.23. When adjusted for hospital characteristics (teaching status, high technology, bed size) nursing characteristics (age, sex, and full time employment status), specialty of unit,
and country, the OR was 1.05 with a range of 1-1.1. The effect of the practice environment (which looks at the same measures as indicated in earlier articles for the PES-NWI) on burnout, the unadjusted OR was 0.69 with a range of 0.66 to 0.73. The adjusted OR was 0.71 with a range of 0.68-0.75 (Aiken et al., 2012).

Now the results will be limited to the effect of staffing or nurse: patient ratio given the focus of the EBP project. The effect of staffing on job dissatisfaction adjusted for the previously mentioned characteristics (teaching status, high technology, bed size, age, sex, and employment status) was 1.06 with a range of 1.03-1.09. Unadjusted, the OR was 1.17 with a range of 1.13-1.21. The effect of staffing on intent to leave was 1.1 unadjusted with a range of 1.05 to 1.15. Adjusted OR was 1.03 with a range of 0.98 to 1.08. Staffing effect on nursing ranked poor or fair quality of care in the unit unadjusted was 1.2 with a range of 1.16-1.25. Adjusted was 1.06 with a range of 1.03 to 1.1. The effect of staffing on nurse ranked safety grade per unit unadjusted was 1.2 with a range of 1.16-1.25. Adjusted OR was 1.06 with a range of 1.03-1.1. The effect of staffing on nurses not being confident that their patients can manage their own care after discharge was unadjusted OR of 1.1 with a range of 1.06-1.13. When it was adjusted, this was 1.04 with a range of 1.01-1.07. In the outcome of nurses not being confident that hospital management would resolve their problems, the effect of staffing unadjusted was 1.12 with a range of 1.09-1.17. Adjusted, the OR was 1.01 with a range of 0.98-1.03 (Aiken et al., 2012).

When looking at the effects of nurse burnout and patient rating a hospital of 9 or 10, the OR was 0.92 with a range of 0.89-0.94 when unadjusted. Adjusted (teaching status, high technology, bed size, age, sex, and employment status), the OR was 0.93 with a range of 0.91-0.96. The effect of burnout on a patient definitely recommending the hospital, the unadjusted OR was 0.91 (0.88-0.94). Adjusted, the OR was 0.93 (0.9 to 0.96). In terms of a patient reporting favorable nurse communication, the unadjusted OR on burnout was 0.97 (0.94-0.99). The adjusted OR was 0.98 (0.96-1.01) (Aiken et al., 2012).
When looking at the effects of patient: nurse ratio and patient rating a hospital of 9 or 10, the OR was 0.95 with a range of 0.93-0.97 unadjusted. Adjusted (teaching status, high technology, bed size, age, sex, and employment status), the OR was 0.96 with a range of 0.94-0.98. The effect of patient: nurse ratio on a patient definitely recommending the hospital, the unadjusted OR was found to be 0.93 (0.91-0.96). Adjusted, the OR was 0.95 (0.92 to 0.97). In terms of a patient reporting favorable nurse communication, the unadjusted OR with nurse to patient ratio was 1 (0.98-1.02). The adjusted OR was 1(0.98-1.02) (Aiken et al., 2012).

The overall summary of the research was that in all countries, nurse staffing and the quality of the work environment was significantly associated with patient satisfaction, quality and safety of care, and nurse workforce outcomes. It was thought that organizational behavior and the retention of a qualified and committed workforce was a promising area to improve hospital safety and quality both nationally and internationally (Aiken et al., 2012).

Another article looked at how changes in hospital work environments and nurse job outcomes changed over time. The research method was a retrospective, two-stage panel design from a large randomized sample of nurses in Pennsylvania (PA) in 1999 and in 2006. The research used 137 hospitals in the state of Pennsylvania for the data. This is similar data from other articles previously discussed. The researchers thought that the longitudinal data would provide a stronger case to improve nurse work environments rather than just relying primarily on cross-sectional studies (Kutney-Lee, Wu, Sloane & Aiken, 2013).

The data collected from the nurses was the Pennsylvania Registered Nurse Survey from 1999 and the Multi-State Nursing Care and Patient Survey in 2006. More than 42,000 nurses in 1999 returned the survey, which was a response rate of 52%. While in 2006, 25,000 nurses returned the survey for a total of a 39% response rate. A double sample of 650 non-responders from the survey in 2006 was done to rule out any response bias on the variables of interest. No evidence of response bias from this double sample was found. A total of 9,345 acute care staff nurses responded to the survey in 1999 and a total of 5,957 staff nurses responded in 2006.
The average per each hospital was approximately 70 nurses in 1999 and in 2006, 49 nurses per hospital responded. Only hospitals that had at least 10 nurses respond to the survey were used in the final analysis. For the data regarding hospital characteristics, the American Hospital Association (AHA) Annual Survey data for corresponding years was used (Kutney-Lee et al., 2013).

The primary measurements of study variables were the emotional exhaustion subscale of the Maslach Burnout Inventory and the PES-NWI. Both are validated tools that have been utilized in previous studies that looked at nurse burnout and nursing environment. The five subscales of the PES-NWI have been stated previously which are: staffing and resource adequacy, nurse manager ability, leadership, nurse-physician relations, nurse participation in hospital affairs, and nurse foundations for quality of care. A composite PES-NWI score was calculated for each hospital for the two years by taking the average of four of the five PES-NWI subscales. Kutney-Lee et al. (2013) omitted staffing and resource adequacy due to its correlation with the staffing measure, which was included in the researchers analyses. This could weaken the validity of the results because if they had included both and the results were similar, then the results could be considered more reliable (Kutney-Lee et al., 2013).

Kutney-Lee et al. did discuss limitations to their study, which helps to strengthen the study. One limitation was that the two-period difference model should theoretically account for unobserved and unmeasured characteristics that did not change over time, but there was a potential that the effect of the variables that could not be necessarily be measured such as a hospital’s fiscal health and internal quality improvements. There was also no direct measure of nurse turnover. Kutney-Lee et al. also acknowledged the study limitation of only using one state for the research.

The results that are discussed in this paper will focus on burnout or staffing. While work environment was also looked at in the Kutney-Lee et al. paper, given the EBP focus of staffing
and nurse burnout, work environment will only be discussed in its relationship to nursing burnout; otherwise the results of work environment will not be discussed here.

The overall results showed that an improvement in the work environment had a strong negative association with changes in rate of burnout, intention to leave, and job dissatisfaction (all $p<0.01$). Improvements in nurse staffing were significantly associated with decreased burnout rates over time ($\beta=-3.63, p=0.03$) in a two-period difference model regression that accounted for baseline staffing, work environment, teaching status, along with size and technology status. In the same model regression, the effect of work environment improvements had an approximate 6.42% decline in burnout with a $p$ value of $<0.01$. The effect of staffing on intent to leave and job dissatisfaction was not necessarily significant with a result of 0.47, $p$ value of 0.68 for intent to leave and -0.96 for staffing, $p$ value of 0.47 (Kutney-Lee et al., 2013).

In a summary of hospitals that improved their work environment according to the PES-NWI scale, the decline of burnout was approximately 5.4% with a $p$ of 0.04. In hospitals that had a decline in their work environment, there was a 7.35% increase in burnout with a $p$ of $<0.01$. In hospitals that did not have a change in their work environment, there was an approximate 1.7% decline in burnout with a $p$ of 0.34 (Kutney-Lee et al., 2013). The overall conclusion drawn from the study was that by using longitudinal panel data, the researchers demonstrated that hospitals that are able to improve their work environment may have lower rates of burnout, intent to leave, and job dissatisfaction amongst their nurses (Kutney-Lee et al., 2013).

Another article included in this review of evidence for the project looked at burnout among hemodialysis nurses in the US. While hemodialysis nurses are not technically “inpatient” bedside nurses, there are enough similarities that it was thought to be pertinent to the project. The study was a cross-sectional, correlational design of a survey of nurses that were randomly drawn from the American Nephrology Association’s membership list. There was a survey response rate of approximately 52% with a total of 1,015 RNs. The survey then used the 422 nurses from 47 states that were currently working in a hemodialysis facility. The measure
utilized in this study was the Emotional Exhaustion Subscale (EES) of the Maslach Burnout Inventory. Nurse workload was measured through the five-item Workload subscale of the Individual Workload Perception Scale. Acceptable psychometric properties of the scale and subscale in samples of nurses have been established. The PES-NWI was also utilized which has been utilized in many research articles for nurse work environments and has been endorsed by the National Quality Foundation as a standard measure of the nursing practice environment. The different subscales have been discussed previously in above research articles and will not be discussed again. Impaired nursing care processes were also measured through a survey of items, which has also been developed and tested in previous studies. It was slightly reworded for the hemodialysis setting, which may impair the reliability of the results (Flynn, Thomas-Hawkins, & Clarke, 2009).

For the actual results, the burnout scores were separated into two categories of either a) no occupational burnout as indicated by a score on the EES of 26 or b) a state of burnout as indicated by a score on the EES score of 27 or higher. The four staffing sections were computed as a) up to 4.61 per RN which was rated as the lowest patient–to-RN ratio or “best” staffing, b) 4.62 to 7.99 patients per RN, C) 8 to 11.99 patients per RN, and d) 12 or more patients per RN which was considered the “worst” staffing with the highest patient-RN-ratio. PES scores were broken down into two sections: a) the lowest score being 2.36 or lower which indicated the least supportive environment and b) 3.14 PES score or higher which indicated the most supportive environment (Flynn, Thomas-Hawkins, & Clarke, 2009).

The actual results showed that burnout was prevalent in 31% of nurses or 132/422 RNs. Of the 132 nurses who were reporting burnout, 59% of those nurses had workload scores of 13 or higher which was the highest score for level of workload. A total of 23.3% of nurses stated that their workload would cause them to look for a new position. The effect of RN: patient ratio with 12 or more patients vs. 4.61 or less on burnout was not found to be statistically significant when calculated with the staffing subscale from the PES measure. If the effects of the RN:
patient ratio and the PES measure are calculated together, the result was 1.83 with a range of 1.04 to 3.22, \(p\) value of < .05. The workload score was found to be significant when calculated separately from the staffing subscale from the PES measure at 12.37 with range of 5.86-26.07, \(p\) value of <.001. If estimated jointly, the OR was 5.23 with a range of 2.18-12.57 at scores of 13 or higher vs. 8 or less. Practice environment with scores of 2.43 or lower v. 3.21 or higher was found to be significant with an OR of 12.13 with a range of 5.90-24.93 when estimated separately from the effects of the five PES composite measures. If estimated jointly, the effect of practice environment OR was found to be 4.60 with a range of 1.96-10.78, both with a \(p\) value of <.001. When looking at care left undone and estimated separately from the PES composite measures, the effect on burnout was found to be 8.75 with a range of 4.50-17.01, \(p\) value of <.001. When estimated jointly, the OR was found to be 2.68 with a range of 1.17-6.14, \(p\) value of <.05. Therefore, the results show that workload had the highest impact on odds of nurse burnout. Logistic regression was also used to estimate the effects of burnout on nurses’ intent to leave their employer was found to be significant with an OR of 2.7 with a range of 1.59-5.86, \(p\) value of .00 (Flynn, Thomas-Hawkins, & Clarke, 2009).

The overall conclusion from the study was that high workloads, unsupportive practice environments, and impaired care process were significantly associated with increased odds of burnout (Flynn, Thomas-Hawkins, & Clarke, 2009). While this was a good study that showed the effect of high nursing workload on burnout, the fact that there was no discussion of limitation of results which may impair the overall integrity of the study.

Another article by Spetz & Herrera (2010) evaluated changes in nurse satisfaction in California from 2004 to 2008 after the implementation of the staffing laws or mandatory RN: patient ratios. The aim of the study was to evaluate for improvement in the satisfaction of hospital-employed RNs from surveys that were performed in 2004, 2006, and 2008. The data for the research was collected by the California Board of Registered Nursing through a survey. Satisfaction was measured with a 30-item survey on a 5-point Likert Scale. The survey was sent
to a random sample of 8,796 nurses in 2004. In 2006, the survey was sent to a stratified random sample of 9,000 RNs. In 2008, the survey was sent to a stratified random sample of 10,000 RNs. Given the focus of the study on inpatient nurses, the data was restricted to inpatient nurses which consisted of 2,193 RNs in 2004, 2,247 RNs in 2006, and 2,524 RNs in 2008 (Spetz & Herrera, 2010).

The satisfaction score for 2004 was 3.88, 4.08 in 2006, and 4.11 in 2008. The change from 2004 to 2006 was 0.20 with \( p \leq 0.05 \). The change from 2006 to 2008 was 0.03 with \( p \leq 0.05 \). Workload, which was only measured in 2006 and 2008, went from 3.35 to 3.42 for a change of 0.07, \( p \leq 0.05 \). Logistic regression was also estimated with the binary variables in an attempt to control for nurse and job characteristics that may affect job satisfaction. When logistic regression was performed, OR of job satisfaction in 2006 was 1.38 for staff RNs, in 2008 the OR was 1.28 with \( p \) value of \( \leq 0.05 \). Odds ratio from job satisfaction and satisfaction with the nursing profession was 1.38 for staff RNs in 2006, in 2008, the OR was 1.28 with \( p \leq 0.05 \).

Limitations were discussed in this study. The main limitations were thought to be that the respondents might not represent all California RNs. The survey did not also take into account quality improvement projects and regulations that may have occurred amongst the hospitals, which may have helped to improve RNs job satisfaction scores. The overall conclusion from the research was that there was improvement in most aspects of nurse satisfaction between 2004 and 2008. The implications were thought to be that efforts to improve workplace conditions appear to have been effective in improving overall job satisfaction (Spetz & Herrera, 2008).

Another study looked at predicting RN job satisfaction and predicting intent to leave. The objective of the study was to investigate the influence of nurse attitudes, context of care, and structure of care on job satisfaction and intent to leave. The method of choice for the research
was a non-experimental, predictive design in a nonrandom sample of registered staff nurses. The limited number of nurses and non-randomized sample may limit the applicability of the results to nurses as a whole. The sample of nurses was a convenience sample of RNs that were employed on 2 medical floors, 2 surgical floors, and 3 ICU’s at a 450-bed university medical center in West Virginia. A variety of tools were used to obtain information and the variables that were looked at were: 1) RN job satisfaction, 2) intent to leave, 3) nurse manager leadership style, 4) unit turbulence, 5) staffing, 6) autonomy and control of practice, 7) nurse/physician collaboration, 8) support services, 9) group cohesion, 10) hardiness, and 11) psychological empowerment (Larrabee et al., 2003).

The results showed that RN’s who had graduated less than 5 years earlier or who had been in their current job less than 5 years were more likely to indicate intent to leave their jobs. It was also found that nurses who were satisfied with the amount of time to be able to devote to patient care, the variety of clinical challenges, and the opportunity to be of service to others and engage in research were 2.4x more likely than other RNs to indicate no intent to leave their current job. When looking at job satisfaction, empowerment was found to explain approximately 54% of job satisfaction. Within empowerment, the breakdown of transformational leadership, hardiness, and group adhesion was found to explain approximately 63% of the variance ($P < .0001$) (Larrabee et al., 2003).

Within this article, there was a discussion of limitations in which Larrabee et al. (2003) stated that application of the findings to other sites should be done cautiously due to the homogeneity of the study and non-random nature of the sample. Larrabee et al. felt that further replications of this study needed to be done using multiple, diverse sites in order to corroborate the findings and increase generalizability of the results.

The finalized results were that the major predictor of intent to leave was job dissatisfaction. The major predictor of job satisfaction was found to be empowerment. Predictors of psychological empowerment were hardiness, transformational leadership style,
nurse/physician collaborations, and group cohesion (Larrabee et al., 2003). While this article does not specifically deal with nurse staffing and burnout, it does show that empowerment through improvement of transformational leadership style, increased nurse/physician collaboration, and group cohesion may decrease registered nurses intent to leave (Larrabee et al, 2003).

The final article looked at nurses’ report on hospital care of staffing, organization, and outcomes in five countries. The sample consisted of 43,329 nurses from all hospitals from the state of Pennsylvania in the US, 13,471 nurses in Canada, 5,006 nurses from England, 4,721 nurses from Scotland, and 2, 681 nurses from Germany who were working in an adult acute care hospital between 1998 and 1999. The Maslach Burnout Inventory was used as the tool to measure nurse burnout and emotional exhaustion. Response rates were documented as varying from 42%-53%, but no percent range per country was given. It also does not say whether it was a randomized sample, it only states that in Pennsylvania, 50% of nurses were sampled. Therefore, this study may be considered as lacking a certain level of clarity in terms of methods regarding the research. There also appeared to be no clear discussion of limitations, which also may be seen as limiting the quality of the study (Aiken et al., 2001).

The results overall results on burnout show that 43.2% of US nurses reported high burnout, while only 32.9% in Canada, 36.1% in England, 37.7% in Scotland, and a low of 17.4% in Germany scored as having high burnout. The discussion will now focus on the results of the US, given the focus of the EBP project on a US Midwestern academic hospital. In terms of staffing, only 34.4% of US nurses’ thought there were enough registered nurses to provide high-quality care. Approximately the same number of nurses thought there was enough staff to get the work done at 33.4%. In terms of support service, 43.1% of nurses felt that there was adequate support service. When looking at past year changes from 1998-1999, in the US, 83.2% of nurses felt that there had been an increase in the number of patients assigned to
them. Overall, in terms of quality of care, 44.8% of nurses felt that the quality of care had deteriorated in the past year (Aiken et al., 2001).

While this study is older, the fact that there had been political changes resulting in a decrease in Medicare hospital payments with the Balanced Budget Act, the results could be felt to be similar to the current changes which are ongoing in our current healthcare environment with “Obamacare” and similar decreases in reimbursements or refusal of insurances to pay for infections acquired in hospitals. Therefore, this article does lend evidence to the support of nurse staffing and burnout along with showing a related decrease in nurse rated quality of care. While there were no clear cut conclusions stated in the article on the research data, the researchers did state that the findings were suggestive that the major workforce changes needed to take place in order to have an adequate number of nurses in the future and to ensure acceptable quality of care (Aiken et al., 2001).

**Best Practice Recommendation**

The results of the articles are clear. According to the research, there is a clear relationship between nurse staffing with nurse workload and burnout. By improving nurse staffing and/or decreasing nursing workload, nurse burnout should decrease. Along with decreasing nurse burnout, there is the potential to decrease RN turnover, improve patient safety, and decrease mortality.

Within the review of the literature for the project, it is also clear that the Maslach burnout instrument is a reliable tool for assessment of nurse burnout in the EBP project. Unfortunately, burnout is prevalent among nurses and is often times considered part of the job. In this current climate of cost-containment, nursing management must not lose sight of the far-reaching effects that nursing burnout has on nursing turnover as well as patient care and safety.

**Answering the Clinical Question**

The literature supports the focus of the project on decreasing burnout through implementation of a nursing workload instrument as a guide for proper level of patient care. If a
patient meets an ICU (Intensive Care Unit) level workload in a PCU (Progressive Care Unit), then the PCU unit may have both improper nurse: patient ratio and too high of a nursing workload to safely care for patients. The data that was collected in this EBP project can be used to guide practice changes to ensure the needs of the nursing workforce within the PCU are met. It is clear from the data that having an improper nursing workload and/or incorrect nurse staffing for a unit can have clear negative outcomes. These negative outcomes can be defined as nursing burnout, dissatisfaction, and increased intent to leave or job turnover. In terms of patient care, outcomes can be defined as increased infections such as urinary tract or respiratory infections, decreased patient satisfaction, decreased quality and safety of care, increased mortality and failure to rescue, and may even affect patient readiness for discharge. Providing a nursing workload tool such as the NAS as a guide for placement in the PCU will help to ensure that the patients are in a proper level of care according to their nursing workload which will not only help to decrease burnout but improve the overall environment in which patient care takes place.
CHAPTER 3

IMPLEMENTATION OF PRACTICE CHANGE

The PICOT question addressed in this project is: For registered nurses on a Medical Progressive Care Unit (MPCU) at a large urban hospital, will increased physician awareness of nursing workload and implementation of a nursing workload scoring system as a guide for correct placement of patients, help reduce nursing burnout over a three-month period? The evidence presented in Chapter 2 supports the link between correct staffing according to nurse workload and decreased burnout. Within this chapter, phase four of the Stetler Model will be discussed in regards to the EBP project (Stetler, 2001).

Participants and Setting

Participants for this EBP project were registered nurses who worked on a Medical Progressive Care Unit (MPCU) in a large urban hospital in the Midwest. For the purpose of the Maslach Burnout Inventory (MBI) tool, it was only applied to nurses that are off orientation at the beginning of the project. This included a total of 36 nurses. There were a total of 45 nurses at the time of implementation of the project in the MPCU. The majority of the nurses had their bachelor in science in nursing. One nurse was a diploma prepared nurse; four had their associates’ degrees and are in school or will be going back to school as part of their job requirement, and one nurse had their associate’s degree and was not hired under the requirement of obtaining their bachelors at some point in order to be hired.

The majority of nurses were hired in the year 2010 or later. Due to turnover, 15 of the 45 nurses were actually hired in the year 2015. Only 7 nurses were hired before 2000. Many of the nurses were younger as well and are in their early thirties or twenties. Only two nurses are male, the rest of the nurses in the MPCU are female.

The hospital in which the EBP took place is a tertiary referral center in urban Indianapolis that is part of a larger comprehensive health system. This private, non-profit system
is directly affiliated with a university. The hospital is made up of approximately 330 beds but is currently limited to approximately 290 beds due to staffing needs and lower patient numbers (Associate Administrator, personal communication, July 21, 2015). Given the fact that the hospital is a tertiary hospital, it is unique in that the majority of the patients come from various parts of Indiana, as well as neighboring states. The hospital takes all types of insurance including Medicare, insurance, and self-pay. Given that it is directly affiliated with a university, many of the nurses and other healthcare workers are familiar with participating in research or having their patients participate in research.

**Outcomes**

The primary outcome of interest for the EBP project was to decrease nurse burnout by implementation of a nursing workload system (NAS) as a guide for correct placement of patients. At the beginning of the project, the MBI was collected as a baseline for burnout amongst the MPCU nurses and at the end of the project to evaluate for changes. Another outcome that studied was if any demographic variables had an effect on the level of burnout. For example, were nurses in their twenties more burnt out than older nurses? Did married nurses have higher or lower levels of burnout? Were newer nurses more burnt out than nurses who had been in nursing for ten or twenty years?

**Intervention**

The literature review supported the link between nurse workload and burnout. The intervention was to be filling out the NAS on each patient daily in the MPCU. If the patient reached an ICU level workload score of 54, then the researcher or rapid response nurse would be notified. If the patient was deemed appropriate for the ICU, then the primary team would be notified and the ICU physician would evaluate the patient. If the patient was not deemed ICU material, but met previously established criteria for a pulmonary consult, then a pulmonary consult would take place. The already established criteria for a pulmonary consult was continuous positive airway pressure (CPAP) or bilevel positive airway pressure (BIPAP)
continuously. Another criterion for pulmonary consult was if a patient was requiring high flow heated humidified nasal cannula. The score for 54 was set as the threshold for inappropriate level of workload for patients in PCU. This number was set by the initial study by Miranda et al. (2003) in which a large, multi-country, multi-hospital study developed the NAS from a previously validated workload tool named the Therapeutic Interventions Scoring System-28.

Another indirect intervention was going to be the ICU/pulmonary physicians’ education regarding nursing workload and the NAS. This intervention took place prior to the start of the project in a weekly conference. The education consisted of a PowerPoint presentation and was approximately 30 minutes in length.

Planning

Initial planning for this EBP project consisted of a literature review to determine a feasible measurement of nursing workload. The literature review also evaluated for an evidenced base link between workload and/or nursing staffing and burnout. The NAS was decided as the tool of choice for measuring nursing workload. This was due to the fact that it was a modified version of a previously validated tool and was estimated to account for at least 81% of a nurse's time (Miranda et al., 2003). This appeared to be a higher percentage than others (Miranda et al., 2003). After determination that there was a link between workload and/or nursing staffing and burnout, the project proceeded further. The next step was to contact the nursing director and manager to gain support. After support was gained and the tools were initially presented to the manager and director, an initial survey of 5-6 day shift nurses on the unit was done regarding the tool. While the nurses were concerned about the amount of time that it may take away from their patients, they did seem to feel that it would accurately measure their time and were willing to participate.

In regards to physician education, it was easily determined to present to a larger number of pulmonary/ICU physicians who attend a weekly chest conference in which research and data is presented. It was determined that it would be done prior to the start of the project. It was also
determined that it would be most appropriate to present prior to the start of interviewing season for the next round of potential critical care (ICU)/pulmonary fellows. Therefore, the date needed to be in August and the people already scheduled for the weekly conference were emailed and asked if they would be available to switch. After agreement, the date for the physician presentation was set. Throughout this time, continued support for the project was given as the director and manager of the MPCU was updated in regards to the project.

Additional planning required was how to keep the daily NAS scores confidential. After presentation to the physicians, a physician recommended use of REDCap, which is an online, secure research database that allows for creation of online research tools. After a secure RedCap account was established, the NAS workload tool was created with only the project manager having access to the NAS workload scores and medical record numbers. Additional planning that was required was how to keep the MBI scores confidential. It was decided that the MBI would be filled out and placed in a locked “mailbox” for each side of the unit. The locked mailbox was specifically bought for the project and only the researcher had access to the keys. After completion, the MBI and demographic variables were kept in the project manager’s secure house.

Protection of Human Subjects

The protection of human rights was maintained throughout implementation of the EBP project. In the initial state, the project manager completed the proper training through the National Institute of Health (NIH). The project was submitted to the Valparaiso Internal Review Board (IRB) as well in order to ensure the rights of the participants. The project went through the proper channels of the hospital organization for approval, as well. The project was also presented to the nursing research committee of the hospital. The participants all signed a consent form (see Appendix B) in order to ensure their awareness of the study and the risks that may be incurred (increased burnout).
Confidentiality of both the patients and the nurses was ensured throughout the study. The MBI form, demographic form, and consent form were kept in the locked mailbox prior to being taken to the project manager's locked home. Confidentiality of both the nurses and the patients was also ensured through the reporting of the data. All of the data was reported in aggregate and no individual's data could be identified. The MBI and demographic variables were numerically identified without names in order to also ensure privacy. The confidentiality of the patient was also safeguarded through the use of the secure REDCap database in which only the researcher had access to the medical record numbers and scores.

**Recruiting Participants**

Participants were recruited from the pre-established cohort: Medical Progressive Care Unit Nurses who were working bedside as staff members. Participants were asked to fill out the MBI through a weekly update that is sent out to nurses of the MPCU. Flyers in the break room and bathrooms were also utilized for recruitment for the MBI. It was understood that the filling out of the MBI was voluntary.

In regards to the NAS, education was done through meetings prior to the initiation of the project as well as through informal education done by the project manager when nurses on the unit had availability or time to listen. The understanding was that the NAS should be filled out daily to help serve as a guide for transferring of patients to the proper placement according to the workload (ICU).

**Practice Change Implementation**

**Data**

The data for this EBP project was evaluated by pre-test and post-test measures. The data was evaluated to determine the effectiveness of the nursing workload intervention for burnout in the MPCU staff nurses. The MBI was collected at the initiation and completion of the study. Furthermore, the data was evaluated with secondary analyses to compare burnout within
subgroups according to age, years in practice, marital status, race, highest level of education, and sex.

**Measures and Their Reliability and Validity**

The Maslach Burnout Inventory (MBI) is considered one of the most commonly used instruments for measuring burnout. The MBI captures three different components of burnout. It looks at emotional exhaustion (EE), depersonalization (DP), and personal accomplishment (PA). The MBI has been validated amongst nurses in a large scale, cross-sectional survey of nurses from eight different countries, including the United States. In this study, the three different subscale exhibited high reliability with Cronbach alphas exceeding the critical value of 0.70. Specifically in the US, 13,204 nurses were utilized from 209 hospitals for the study. Amongst the subscales, the emotional exhaustion piece had a correlation coefficient of 0.93. The personal accomplishment subscale had correlation coefficient of 0.82. The MBI depersonalization subscale had a correlation coefficient of 0.82 (Poghosyan, Aiken, & Sloane, 2009).

When an analysis of the MBI was conducted among a convenience sample of 151 Florida nurses, the findings are similar as well. The Cronbach’s alpha for emotional exhaustion was 0.88. The Cronbach’s alpha for the depersonalization score was 0.80. The Cronbach’s alpha was found to be 0.75 in the personal accomplishment subscale of the MBI. Clearly, the results from these studies demonstrate the validity in regards to the use of the MBI as a tool for use in assessing nursing burnout.

The formulation of the Nursing Activities Score (NAS) as a tool for measuring nursing workload was a very large study and in-depth in its formulation. It was developed as result of modifications to the Therapeutic Interventions Scoring System-28 (TISS-28) which was a previously validated workload scoring system for nurses. Data was collected on 2,105 patients in 99 Intensive Care Units from 15 different countries with daily registration of nursing activities (RNAs). Of the 2,015 patients from whom data was collected, 6, 534 RNAs were collected.
6,451 RNAs covered 23 hours (nursing activities which were greater than 24 hours were not collected). The records collected corresponded to the 127,951 multi-moment recordings of nursing activities (MMRs) that were collected during the same time. The times were then weighted and reduced accordingly. After the reduction of the items to Category 1, this was found to correspond to approximately 81% of the total time spent by the nurses of the ICU. Category 1 consisted of 23 items that became the NAS. After applying the weights that corresponded to the actual time spent, the NAS score had a distribution 56 +/- 17.5 with a median of 54. The scores ranged between 0 and 170. The sum of the weights of the individual scored is supposed to represent the amount of time that is used to score nursing activities. For example a score of 100 indicates that a patient required 100% of the nurses' time in 24 hours (Miranda et al., 2003).

Since this time, the NAS has been used in many different studies regarding nursing workload. In a sample of 200 adult ICU patients, the validity was demonstrated with a statistically significant correlation between the TISS-28 (the previous workload measure) and NAS (r=0.67, p<0.0001). As well as with multivariate regression analysis (R2=94.4%, p<0.001). It was also thought to be valid due to the correlation between the NAS and the Simplified Acute Physiology Score (SAPS) II which is another tool to predict hospital mortality, when adjusted for age (R2=99.8%, p<0.0001 (Padhila et al., 2010).

There has been found to be correlation between the NAS and Apache II score as well with a Pearson’s correlation coefficient of 0.329, p value of <0.001. As discussed earlier in chapter 1, the Apache scores are a prognostic indicator of inpatient mortality for the patient. There is also a correlation between the NAS and the Sequential Organ Failure Assessment (SOFA) which helps to characterize patient severity of illness. The Pearson’s correlation coefficient was found to be 0.506, p value of <0.001 (Altafin et al., 2014).

There is no perfect nursing workload scoring system given the complexity of nursing workload. The NAS is the most recently developed tool as it was developed in 2003, and it
appears to be able to account for the majority of a nurses' time with an estimate of 81% as validated in the first large, multi-center, multi-country study.

**Collection**

Prior to the start of the implementation of the NAS, the MBI and demographic variables was completed, as well as the consent form. The demographic variables (Appendix C) and MBI were completed at the end of the collection of the NAS (Appendix D) as well. The NAS was completed on each patient in the MPCU daily for the first eight weeks of the project. The last four weeks, the NAS was only collected on patients who may benefit from a transfer to the Medical Intensive Care Unit from a medical instability standpoint. As was stated previously, the MBI and demographic variables was coded numerically in order to eliminate use of names. The MBI and demographic variables were all collected through use of the locked “mailboxes” which were located on the unit. The NAS scores were completed through the online database in which a link to the tool was placed on Internet explorer toolbar.

Education in regards to the MBI, demographic variables, and NAS was completed both formally and informally. Formally, it was presented in a brief presentation to the nurses on the unit during their monthly meeting with the manager. Informally it was presented to individual nurses when they were eating lunch or if they were able to spare a few minutes for education. Handouts regarding the use and directions of the NAS were placed throughout the unit as well. The NAS was filled out daily for the first eight weeks of the project in order to collect reliable data on the NAS workload scores for the unit. The overall goal of the documentation of the NAS was for it to be done during change of shift so that the off-going nurse could help with the filling out of the NAS to make it more efficient. In reality, the NAS score was filled out as the day shift nurse had the time to document, which ended up being at various times of the day. For the last four weeks of the project, due to the time needed to fill out the NAS score, the nurses only performed the NAS score on patients who the nurses felt may benefit from transfer to the
Medical ICU from a medical instability standpoint in order to add further information on whether or not the patient should transfer to the Medical Intensive Care Unit (MICU).

Summary of Implementation

This chapter involves phase four and five of the Stetler Model. Phase four (translation and application phase) involved taking the evidence regarding nursing workload and making it into a workable EBP project (Stetler, 2001). Phase five is the evaluation mode, which involved looking at the NAS and MBI as part of the outcome data. Overall, each phase of the Stetler Model was followed in order to ensure successful implementation of the EBP project.
CHAPTER 4
FINDINGS

The purpose of this EBP project was to decrease burnout of nurses on a Medical Progressive Care Unit (MPCU) by utilizing a workload tool as a guide for proper placement of patients according to nursing workload. Secondary goals were to increase physician awareness regarding nursing workload and the affect that improper workloads have on both nursing and the patient. The final goal was to provide additional support to increase nursing staffing levels to more appropriate levels for the current nursing workload of the unit. The compelling clinical question to be answered by this EBP project was: for registered nurses on a MPCU at a large urban hospital, will increased physician awareness of nursing workload, as well as implementation of a nursing workload system as a guide for correct placement of patients help reduce nursing burnout over a three-month period?

Participant Characteristics

The following section provides a description of the participants included within this EBP project sample. Participant characteristics include sample size, demographics, and attrition details. The demographic data was collected during the pre-implementation process of the project. The demographic data sheet was administered prior to implementation of the workload tool and can be found in Appendix C. The demographic sheet contained six items that were evaluated: age; gender; highest level of education; number of years in practice; race; and marital status. The group results can be seen in Table 4.1.

Size

Of the 36 nurses eligible to fill out the Maslach Burnout Inventory tool (MBI), 32 (89%) completed the initial tool and demographic variables. During the course of the project, a total of six nurses left the MPCU therefore; they did not fill out the post MBI. One had completed the pre-implementation MBI, but still worked on the unit, did not complete the post project MBI. This
made for a total of seven individuals who did not complete the post project MBI. A total of 25 participants filled out both the pre and post project MBI for data analysis. The data for the paired sample t-test was analyzed from the participants who filled out both the pre and post MBI to evaluate whether the intervention decreased nurse burnout scores. The participants who did not complete the post MBI were excluded for the statistical analysis on whether or not the intervention decreased burnout scores.

**Nurse Characteristics**

Upon analysis of the demographic form, the age distributions of the nurses who filled out the pre-implementation MBI were as follows: 46.9% were between the age ranges of 21-30, 31.3% were between the ages of 31-40, 9.4% were between the ages of 41-50, and 12.5% were between the ages of 51-99. In regards to educational background, the distributions were made up of the following: 6.3% had attained an associate degree, whereas 93.8% had attained a bachelors’ degree. There was no direct distinction made on the demographic variable form as to whether the bachelor’s degree was in nursing or another field. The years of practice were heavily dominated by inexperience and were made up of the following range: 43.8% had a year or less of experience, 40.6% had 2-5 years of experience, 6.3% had 11-20 years of experience in nursing, and 9.4% had 25 years or more of nursing experience. Marital status was made up of somewhat similar percentages: 46.9% were single, 46.9% were married, 3.1% or one participant was divorced, and 3.1% or one participant was widowed. Only one or 3.1% participants were male, with 96.9% or 31 participants were female. The participants also were largely were of Caucasian background at 96.9%, as only one participant was African American. During the project, the one African American participant left the MPCU, making the post data participants’ all of Caucasian descent. Of the nurses who filled out the pre-implementation MBI and who left the unit during the project, all had bachelor’s degrees and had 5 years or less of experience in nursing. The characteristics for nurses who participated in the pre-implementation MBI tool can be found within Table 4.1 at the end of this chapter.
**Instrument reliability**

The EBP project utilized the 22-item MBI as the instrument of choice. The MBI was important to the EBP project, as the focus of the EBP was to decrease burnout through a potential decrease in workload. The MBI directly measures burnout of individuals. The MBI has three subscales, which are made up of Emotional Exhaustion (EE), Depersonalization (DP), and Personal Accomplishment (PA) subscales. The three subscales are totaled individually and not as a whole. Therefore, the Cronbach alpha was run on both the total item MBI and the three individual subscales. The Cronbach alpha on the total 22-item pre-test had an alpha coefficient for the pre-test at .735, and the alpha coefficient for the post-test was .728. This demonstrates reliability for the test in this project. When individually evaluating the Cronbach alpha per subscale, the alpha co-efficient for the EE subscales pre and post was .885 and .895, respectively. The alpha coefficient dropped a bit for the DP subscales with a pre score of .789 and post of .748. The PA subscale dropped further with a pre MBI alpha coefficient of .682 and post alpha coefficient of .726. The pre PA accomplishment subscale is the only subscale in which there is a questionable concern for reliability. The reliability of scale with this study correlates with previous studies utilizing the MBI with nurses.

**Changes in Outcomes**

The primary outcome of this EBP project was to decrease nurse burnout by utilizing a nursing workload scoring system to move patients' to a proper level of care by their workload and medical acuity. Other outcomes of interest included the overall Nursing Activities Score (NAS) for the unit and whether it exceeded the ICU level workload. Also of interest is evaluating the nurses who did not fill out the post project MBI and their level of burnout.

**Statistical testing and significance**

A paired sample t-test was used to compare differences in burnout between pre-implementation and post-implementation. This project utilized SPSS and Microsoft Excel for
statistical analysis. The data from the Maslach Burnout Inventory (MBI) was analyzed by evaluating the three subscales of the MBI individually. The three subscales included the PA subscale, EE subscale, and the DP subscale. As demonstrated in the review of literature in chapter 2, workload and the emotional exhaustion subscale are thought to be the most closely correlated when looking at the subscales of the MBI. The EE subscale has also demonstrated higher levels of reliability among nurses. Scores of 27 or over are considered high, scores of 17-26 are moderate, and scores of 0-16 are considered low on the emotional exhaustion subscale (Maslach & Jackson, 1981). Scores of 13 or over are considered high, scores of 7-12 are considered moderate, and scores of 0-6 are considered low on the depersonalization subscale (Maslach & Jackson, 1981). Scores of 39 or over are considered high, scores of 32-38 are considered moderate, and scores of 0-31 are considered low on the personal accomplishment subscale (Maslach & Jackson, 1981).

**Findings**

The findings of the Nursing Activities Score (NAS) score for this EBP project correlate with a high workload per average patient in the MPCU. The NAS is a nursing workload tool for utilization in ICU settings to account for nursing time or activities. The mean for the NAS during the EBP project was found to be 43.55 (SD = 14.57) and the median was 41.80. The mean workload found in the ICU in the original study for the NAS was 56 (SD = 7.5) and the median was 54 (Miranda et al., 2003). All of the patients who were moved to the ICU in the EBP project met at least the median workload of 54, although most workload scores were actually much higher than 54. Chapter 5 will further discuss how the NAS score in this EBP project actually shows increased workload for nurses, even though the scores are lower.

For this EBP project, paired t-test results correlated with reduced emotional exhaustion and decreased nursing workload (see Figure 4.1). A significant decrease was found between the pre and post emotional exhaustion scores. The mean score for the pre emotional exhaustion score was 29.88 (SD = 10.13). This meets a high level for emotional exhaustion for the MBI.
The post emotional exhaustion score was 23.32 ($SD = 8.15$), which lowers the emotional exhaustion scores to moderate. A significant statistical decrease was found with $t (24) = 5.55$, $p < .001$. There was not found to be significant results with the depersonalization and personal accomplishment subscales. The mean DP subscale pre-implementation of project was 10.52 ($SD = 5.16$), post project implementation was 8.88 ($SD = 4.95$) with an overall $t (24) = 1.64$, $p = .114$. Both pre and post project scores are considered moderate for the DP subscale of the MBI. The PA subscale had a pre project mean of 34.54 ($SD = 5.76$), post project mean of 35.21 ($SD = 5.84$) with a $t (23) = -.623$, $p = .539$. Both pre and post scores are considered a moderate level for the PA subscale for the MBI.

When analyzing the scores of the nurses who did not fill out the post project MBI, the scores did not indicate higher levels of burnout when compared to all of the nurses who filled out the project MBI. On the EE subscale, 5 of the 7 nurses scored a high level of EE burnout or approximately 71%. This correlates with the high average EE subscale score for all nurses with the pre project MBI. On the DP subscale, only 3 out of the 7 nurses scored a high level of burnout, or when 43% when averaged. On the PA subscale, only 1 out of 7 nurses recorded a high level of PA burnout on the MBI. Overall, the results correlate with previous research on the relationship between workload and nursing burnout. Literature has shown that nursing workload and the emotional exhaustion aspect of burnout are the most closely correlated.
Table 4.1

Initial Characteristics

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Frequency Table

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Figure 4.1

Burnout Scores
CHAPTER 5
DISCUSSION

The purpose of this EBP project was to decrease burnout of nurses on a Medical Progressive Care Unit (MPCU). The EBP project was designed to answer the question: for registered nurses on a MPCU at a large urban tertiary care center, will increased physician awareness of nursing workload, as well as implementation of a nursing workload system as a guide for correct placement of patients, help reduce nursing burnout over a three-month period?

Nursing burnout was measured using the three individual subscales that make up the Maslach Burnout Inventory (MBI): Emotional Exhaustion, Depersonalization, and Personal Accomplishment.

Explanation of Findings

For this EBP project, data collection took place at two intervals (pre and post intervention), with the demographic data collection-taking place prior to the EBP project. Data analysis utilized SPSS. Pre-project and post-project MBI burnout scores were analyzed using paired t-test. Demographic data was also analyzed to define the sample population and assess for patterns that may have affected the MBI scores.

The main outcome of this EBP was to determine the impact of the main intervention (utilization of a nursing workload system to guide proper placement of patients) on MBI scores. Overall, the results correlate with previous research on the relationship between workload and nursing burnout. Data from this EBP project achieved a statistical level of significance between the pre emotional exhaustion scores 29.88 ($SD = 10.13$) and post emotional exhaustion scores 23.32 ($SD = 8.15$), p value <.001. The Emotional Exhaustion subscale of the MBI is a measure which has been used independently from the other subscales to evaluate burnout in regards to workload (Aiken et al., 2001, Flynn et al., 2009, Kutney-Lee et al., 2013).
There may be many reasons that could account for the decrease in the emotional exhaustion subscale of the MBI for this project. During the post MBI collection period, the MPCU nurses had improved staffing. This was because an increased level of nurse per patient ratio policy was implemented. While the improved staffing wasn’t able to be implemented consistently due to lack of nursing staffing throughout the unit and the hospital, the thought that it would be occurring, may have helped decrease nurses emotional exhaustion scores. What may have also improved emotional exhaustion scores was nurses previously felt like their voices weren’t being heard beyond their manager and director. Now, the Chief Nursing Officer and many other higher-level executives are aware of the significant turnover rates and high nursing workload levels on the MPCU.

In the original study by Miranda et al. (2003), a standard total score of 100 was set to indicate the patient workload of one nurse per shift for a 24 hour period. In other words, two patients scoring 50 each on the NAS would be assigned to one nurse per shift (Miranda et al., 2003). When the Nursing Activities (NAS) scores in this EBP project were analyzed, it initially appeared that the MPCU NAS mean and median were below the ICU mean and median set by the Miranda et al. (2003) study. Within the study by Miranda et al. (2003), the NAS for one patient was found to have a mean of 56 +/-17.5 (SD) with a median of 54 (Miranda et al., 2003). In the MPCU, a median workload score of 41.8 and mean workload score of 43.55 (SD 14.57) per patient was found. Given that the standard ratio is 3 patients: 1 RN in the MPCU, a nurse’s work assignment per shift could easily exceed a total workload score of 100.

Six nurses ended up leaving the unit during the project; five of the nurses went to outpatient or procedural areas. The experience level of the nurses may have played a role in the nurses leaving the unit, as all six who left the unit had five or less years of experience as a registered nurse. Often times, a task that takes an experienced nurse a few minutes to complete; will take a newer nurse exponentially longer to complete. This would leave a newer
nurse with an increased workload based on tasks alone, without accounting for individual patient’s workload.

When looking at individual high scores of participants for each subscale on the pre project MBI, none of the high scores were the nurses who left the unit during the EBP project. Given that the higher scores indicate increased levels of burnout, one can conclude that there are still nurses on the unit suffering from burnout. As changes continue to occur on this unit in hopes of improving the nursing environment, the anticipation is that nursing burnout, in particular emotional exhaustion will continue to improve.

**Applicability of the Theoretical Framework**

The theoretical model, Kanter’s Theory of Structural Power in Organizations, helped to provide purpose to the project throughout the planning, implementation, evaluation, and dissemination phases. Kanter’s Theory of Structural Power is based on the idea that job empowerment has a direct effect on the efficiency of an individual in their job and their ability to accomplish their goals (Laschinger, 1996; Miller, Goddard, & Laschinger, 2001). This in turn, affects the individual’s organizational commitment, job satisfaction, and levels of burnout (Laschinger, 1996; Miller, et al., 2001). Kanter theorized that when individuals do not have access to information, support, resources, and opportunity for advancement, they feel powerless (Laschinger, 1996). The extent of control that individuals feel that they have over the conditions of their work is an important influencing factor in work effectiveness (Laschinger, 1996).

The thought in the preparation, validation, and decision-making stages of the project was that by giving nursing a voice in regards to patient workload through using an objective workload instrument, nurses’ would be able to recognize when a person is not at an appropriate level of care on the unit. This prompt recognition may increase the ability to transfer the patient to a more appropriate level of care.
In the application stage, nurses had the ability to voice their opinion on workload through utilizing a validated nursing workload tool. This voice may have helped lead to decreased burnout and increased feelings of empowerment in application. There were also limitations to the framework in this stage, because as nurses voiced the need to transfer the patient to a more appropriate level of care, extraneous factors, such as lack of nurse staffing in the units or ICU beds, limited the ability to actually transfer the patient. This may have led to feelings of powerlessness to control work conditions. According to this theory, powerlessness leads to decreased job efficiency, organizational commitment, burnout, and job satisfaction.

Regardless, Kanter’s Theory continues to be applicable to the MPCU in the evaluation stage as nursing management continues to push for increased ability for nurses to control their work environment. This should increase job satisfaction and organizational commitment according to Kanter’s Theory.

Applicability of the EBP Model

The Stetler Model was utilized as the Evidence-Based Practice Model for this EBP project. The Stetler Model consists of five phases: preparation, validation, comparative evaluation and decision-making, translation and application, and the final phase of evaluation (Stetler, 2001). The five phases were used to guide the EBP project from the preparation or planning stage through the evaluation phase.

The first phase, preparation, is made up of identifying the problem and performing an initial literature search (Romp & Kiehl, 2009). The problem was easily identified for this project, as the majority of patients in the MPCU could easily be in an Intensive Care Unit (ICU) in many other hospitals throughout the state. This places an ICU level workload on a nurse in the MPCU who has three patients, rather than ICU level staffing of two patients per nurse. This problem was validated with a five day glance of APACHE III scores of the Medical Intensive Care Unit (MICU) and the MPCU. Apache III is a prognostic tool used to predict mortality for critically ill patients. Within the five day period, median APACHE III score for the MPCU was 55 with a
range of 7-99, while the median Apache III score in the MICU was 46 with a range of 14-97 (Director Clinical Operations, Critical Care Services, personal communication, July 17, 2015). After an initial literature search for nursing workload was performed, a link between workload and burnout was established.

The second phase, validation, consists of critiquing the literature and ensuring there is sufficient evidence to proceed to the next phase (Romp & Kiehl, 2009). This phase allowed for evaluation and appraisal of the literature to ensure that the project would be evidence based. This required ensuring that there was enough evidence to proceed with the EBP project intervention.

The third phase, comparative evaluation and decision-making, is made up of evaluating evidence from the literature review to see if the evidence is desirable and feasible to implement. It also requires consideration of the risks that are involved, resources needed, and readiness of the staff for implementation of the project (Romp & Kiehl, 2009). This phase of the project allowed for the project manager to make decisions regarding project implementation. This phase also included obtaining the opinion of staff nurses on what would and wouldn't work for the project, which was crucial to its success. Without nursing buy-in, the project would not have been able to be completed.

The fourth phase, translation and application, is made up of translating the evidence into practice through implementation of the project (Romp & Kiehl, 2009). It also includes a step for variation of the project if needed (Stetler, 2001). This step was essential as a need for variation was identified during project implementation. Within the last four weeks of the project, collection of the NAS took place only when a nurse felt a patient needed to transfer to a higher level of care and needed to voice that concern to the project manager or physician. This change was implemented due to concern that documentation of the NAS daily was leading to decreased patient care time due to increased nursing documentation time, and due to difficulty in having the NAS filled out daily on each patient in the MPCU.
The fifth phase, evaluation, is made up of evaluating the findings and deciding whether the goals of the project have been met. This phase allowed for the project manager to identify that emotional exhaustion levels did decrease with a reduction in nursing workload. The NAS was also identified as a resource that could be utilized beyond the project in trying to decide whether a patient met ICU or PCU appropriate staffing for the nurses. Once enough nurse staffing is hired on the MPCU, seventy percent of patients would be under a standard ICU ratio of 2 patients: 1 RN in the MPCU, rather than the current standard 3 patients: 1 RN. Thirty percent of the patients will still remain under previous standard MPCU staffing of 3 patients: 1 RN. This will require the charge nurse to decide what patients need to be in a 2 patients: 1 RN assignment and what patients can be assigned to the 3 patients: 1 RN assignment. If there is question regarding how to make up the assignments, the charge nurse will have the ability to calculate the NAS in order to make a more informed decision.

The Stetler Model was helpful as it allowed for consideration of variation as well as input from nursing in regards to the planning of the project. This was crucial for success of the project. The five phases were essential to ensuring that the translation of literature into an EBP project was successful.

**Strengths and Weakness of the EBP Project**

There were many strengths and weakness of this EBP project. The main strength of the project was the positive outcome of the project which showed a statistically significant decrease in emotional exhaustion scores post MBI implementation. Furthermore, the project also resulted in the gathering of evidence to support a decreased patient: nurse ratios for the MPCU. Another strength was the increased education of physicians regarding nursing workload. This education results in an increased awareness of nursing workload throughout a physician’s career. Finally, the project increased communication between the nursing staff of the MPCU and the project manager, with the open lines of communication continuing beyond the project. The increased
communication has continued to allow the nurses to use the project manager as a resource in regards to a both a patient’s medical illnesses and nursing needs.

Weaknesses or limitations included increased nursing documentation time to complete the NAS, difficulties in transferring patients, and problems in having the NAS done daily on every patient in the MPCU. Given that the NAS is an ICU workload measurement tool, the validity of the NAS in the MPCU may also be considered a weakness. Further weaknesses include lack of literature that supported the transferring of patients to higher levels of care for a decrease in emotional exhaustion, as well as the level of evidence used was level VI data according to Melnyk and Fineout-Overholt (2010). Overall, while there may have been weaknesses within this project, the positive outcomes or strengths outweigh the weaknesses in terms of significance. Many of the weakness or limitations of the project were due to system issues or factors outside of the project manager’s control.

System issues that impacted the EBP project included lack of beds in the MICU as well as lack of ICU nurses to care for the patients due to nursing shortages at the hospital. This meant that not every patient who met ICU level workload and ICU level acuity could be transferred. The inability to transfer patients caused increased frustration on the MPCU nursing staff as the nurses felt that the patient should be in the ICU and were discouraged. This may have contributed to increased difficulties in the willingness of the nurse to fill out the NAS.

One other system issues that potentially affected the findings of the study included the fact that the nurses were aware that the proposal to increase approximately 70% of the MPCU beds to ICU level staffing with 2 patients: 1RN was accepted prior to the collection of the post project MBI. This may have helped decrease the emotional exhaustion level of the nurses,’ even though the increased staffing was not yet consistently implemented.

Physician willingness to transfer was another weakness encountered in this project. Transferring patients is currently a very physician dependent decision in the hospital instead of a bedside nurse decision. Some physicians are very pro-active about moving patients to the
ICU sooner, while others think that unless a patient requires a pressor (a medication utilized to maintain or increase blood pressure) or a ventilator, there is no need to transfer the patient. This willingness to transfer by physicians may be due to the facility being a teaching hospital. In a teaching hospital, there seems to be a learning curve in figuring out which patients are ICU appropriate and which patients are appropriate for progressive care units. There are also personality differences to account for, as some physicians are willing to move patients based on nursing concerns, while others are not.

One other system issues that potentially affected the findings of the study included the fact that the nurses were aware that the proposal to increase approximately 70% of the MPCU beds to ICU level staffing with 2 patients: 1RN was accepted prior to the collection of the post project MBI. This may have helped decrease the emotional exhaustion level of the nurses,’ even though the increased staffing was not yet consistently implemented.

Overall, given the significant findings of decreased emotional exhaustion, this EBP project can be considered a success.

**Implications for the Future**

This EBP project was developed and implemented due to an obvious workload burden placed on the MPCU nurses. The decreased emotional exhaustion scores of the MBI are noted as a positive outcome for this project. Therefore this project can potentially be used as a guideline for other units needing to gather evidence for increased staffing due to inappropriate workload levels.

**Practice**

Nurse practitioners play a unique role because of their understanding of both a nurses’ workload and the medical needs of the patient. This understanding allows the nurse practitioner to have a direct impact on patient outcomes by ensuring that they are placed in a unit that can meet their needs.
DNP prepared nurse practitioners may be called to a management role in which knowledge regarding the influence workload has on emotional exhaustion of nurses may impact staffing practices. As a manager, it is beneficial to be aware that gathering workload and acuity scores for patients is valuable evidence in formulating staffing proposals.

Theory

Expanding current nursing theory to address nursing workload and emotional exhaustion is essential. Kanter’s Theory of Structural Power, while applicable to the project, is not a nursing theory. Kanter’s Theory also does not specifically address the emotional exhaustion aspect of burnout. Given that emotional exhaustion is a prevalent issue among nurses, nurses would benefit from development of a specific nursing theory to address burnout.

Research

This EBP project contributed to the current body of knowledge in regards to nursing workload and burnout at the bedside level. There is limited research that directly relates the impact that nursing workload has on emotional exhaustion of nurses. There is also very limited research on interventions that decrease emotional exhaustion and nursing burnout.

Future research should evaluate emotional exhaustion at a nurse practitioner level as well as a bedside nursing level. The nurse practitioner is in a unique position to positively change the practice of nursing. Given this, future research should be done on whether patients have improved outcomes when decision to transfer a patient is a collaborative decision making process, including the nurse practitioner.

Education

As nurses are called to manager positions, they would benefit from knowledge in regards to the relationship between nursing workloads and burnout, as well as the negative impact on patient outcomes.

Knowledge regarding workload and patient outcomes can also be used in education of physicians regarding the importance of proper placement of patients according to nursing
workload. The education of physicians may be best done in an informal setting or on a one-to-one basis early in their medical training. By catching residents and medical students in the beginning stages of their education, they may be more open to such education and instruction.

**Conclusion**

The purpose of this EBP project was to answer whether implementation of an ICU level nursing workload tool as a guide for proper placement of patients would reduce nursing burnout on a MPCU. Within this project, Kanter’s Theory of Structural Power and the use of the Stetler Model was used to guide the development of the project. The NAS was utilized as the ICU level workload tool to guide placement of patients. If a patient met the ICU level workload and was considered medically appropriate for the ICU, the goal was to transfer the patient in order to ensure that patients on the MPCU were of an appropriate workload for staffing ratios. Many extraneous factors affected the project but even with such difficulties, a statistically significant decrease in the level of emotional exhaustion for bedside nurses between pre and post project measurement was observed.

Further research is warranted on nursing burnout and interventions that can be implemented to reduce it. Proper placement of patients according to nursing workload will always be affected by extraneous factors. This is why it may be best to staff according to nursing workload, not just severity of patient’s illness. Further research should be done to decide whether staffing according to nursing workload has a reduction in emotional exhaustion for nurses and improves patient outcomes.
REFERENCES


IMPLEMENTATION OF A NURSING WORKLOAD TOOL


BIOGRAPHICAL MATERIAL

Nicole K. Greives

Ms. Greives graduated from Indiana University Bloomington with a bachelor’s degree in the science of nursing in 2005. After graduating with her BSN, she worked at IU Health University Hospital as a registered nurse in the Medical Intensive Care Unit (MICU). During this time, she served as a rapid response nurse in which she helped triage patients on the floor and respond to codes. She also worked as a nurse documentation expert during the transition period of paper charting to online documentation and helped to implement a medication-scanning device into practice at the hospital. In 2010, she acquired her master’s degree at Indiana University Purdue University Indianapolis (IUPUI) as an adult nurse practitioner. While attending IUPUI, she was awarded the Florence Nightingale and Jessie Cross Scholarships, as well as the Health Resources and Services Administration (HRSA) Professional Nurse Traineeship Grant. After graduating, she worked for the hospitalist service at University Hospital before joining the pulmonary/critical care medical service as an inpatient pulmonary nurse practitioner in 2012. She is a current member of Sigma Theta Tau International Honor Society of Nursing, the Coalition of Advanced Practice Nurses of Indiana (CAPNI) and American Academy of Nurse Practitioners.
ACRONYM LIST

AHA: American Hospital Association
CA: California
DP: Depersonalization
EBP: Evidence-Based Practice
EES: Emotional Exhaustion Scale of the Maslach Burnout Inventory
EE: Emotional Exhaustion
FL: Florida
ICU: Intensive Care Unit
IOM: Institute of Medicine
JBI: Joanna Briggs Institute
LOS: length of stay
MMR: multi-moment recordings of nursing activities
MPCU: Medical Progressive Care Unit
NAS: Nursing Activities Scale
NJ: New Jersey
NWI: Nursing Work Index
OR: Odds Ratio
PA: Pennsylvania
PA: Personal Accomplishment
PCU: Progressive Care Unit
PES: Practice Environment Scale
PES-NWI: Practice Environment Scale of the Nursing Work Index
RN: Registered Nurse
RNA: daily registration of nursing activities
US: United States
## Appendix A

### Summary of Appraised Literature

<table>
<thead>
<tr>
<th>Author(s) &amp; Level of Evidence according to Melynk &amp; Fineout-Overholt</th>
<th>Design &amp; Sample</th>
<th>Objectives</th>
<th>Outcomes</th>
</tr>
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</table>
| Pearson et al. (2006) Level V | Systematic Review 40 studies- (1) Systematic Review, (1) Cohort Study, (38) correlational, descriptive studies | To determine the impact of: 1. patient characteristics, nurses characteristics, system characteristics and system processes on workload, scheduling and concepts of productivity and utilization 2. Workload, scheduling and concepts of productivity and utilization on the quality of outcomes for clients, nurses, and system/organization | Burnout and RN: patient ratio findings:  
- Increased severity of illness in patients significantly increases nursing workload (Level 3c)  
- Work satisfaction of nurses may be reduced if the nursing workload is increased (Level 4)  
- High nursing workload is significantly related to increased mortality (Level 3c)  
- High nursing workload is significantly related to increased failure-to-rescue (Level 3c)  
- High nursing workload is significantly related to a decline in patient safety (Level 3c)  
- High nursing workload is significantly related to an increase in the incidence of respiratory tract infections (Level 3c)  
- High nursing workload is significantly related to a decrease in the quality of care (Level 3c according to JBI)  
- Increased patient-nurse ratios were perceived as threats to future employment status by nurses (Level 3c)  
- Nurses who experienced increased patient-nurse ratios reported less job satisfaction and a greater intention to quit (Level 3c)  
- Increases in patient-nurse ratios were associated with lower levels of hospital functioning and effectiveness (more errors/injuries; lower quality of care; and decreased benefits from restructuring and downsizing) (Level 3c)  
- Low negative correlations observed between nurse-to-patient ratios and hierarchical organizational structures and attitudes to care provision were reported suggesting that when nurse-to-patient ratios decrease, hierarchical practices increase (Level 3c)  
- Nurses’ perceptions of their ability to cope with their workload, job satisfaction, and their ability to collaborate with other healthcare professionals are more positive when low patient-nurse ratios exist (Level 3c)  
- Nurses with low patient-nurse ratios view work environments more positively (Level 3c)  
Other findings:  
- A hierarchical approach to practice was lessened when the proportion of nurses of higher grades was increased (Level 3c)  
- Nurses’ perceptions of standards of care were lower with increased reliance on agency nurses (Level 3c) |
<table>
<thead>
<tr>
<th>Authors</th>
<th>Data Description</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Aiken et al. (2011)     | Survey data (correlational, descriptive) Total of 98,116 nurses in 1406 hospitals in 9 countries between 1999 & 2009. In the US: randomized sample of nurses in Pennsylvania, California, Florida, & New Jersey from 762 hospitals for a total of 39,148 nurses | - The level of sickness absence was not related to ward organizational systems or structures but did undermine nurses' perceptions of their ability to cope with workload and work collaboratively (Level 3c)  
- An increase in the proportion of RN staffing that results in an increase in RN hours per patient day is associated with decreases in rates of UTIs, pneumonia, decreased LOS, upper gastrointestinal bleeding and shock (Level 3c)  
- An increase in the proportion of RN staffing can lead to improved patient outcomes in relation to pneumonia, falls, pressure ulcers, mortality, medication doses, injury, turnover, use of restraints, deep vein thrombosis, and failure to rescue (Level 3c)  
- A greater proportion of regulated staffing (licensed staffing) is associated with improved outcomes related to the FIM score, SF-36 vitality score, patient satisfaction with nursing care, patient adverse events (including atelectasis, decubitus ulcers, falls, pneumonia, postsurgical and treatment infection and UTIs) (Level 3c)  
- Increases in total hours of nursing time available may be associated with improvements in patient outcomes in relation to patient's experience of symptoms, other subjective patient outcomes, patients' participation in managing their own healthcare, pressure ulcer rates, mortality rates, medication errors, length of stay, injuries and falls (Level 4)  
- An increase in the number of RN hours available is associated with improved patient outcomes in relation to falls, pneumonia, pressure ulcers, UTI, length of stay, postoperative infection rates (Level 3c)  
- An increase in the proportion of unlicensed nursing staff does not appear to have a negative impact on patient outcomes (Level 4)  
- When nurses are able to determine their shift allocations, this may increase professional commitment (Level 3c)  
- There is insufficient evidence to suggest a relationship between scheduling and nurse or patient outcomes (Level 3c)  
- Overall findings:  
  - High burnout was found in hospitals in all countries except Germany, with ranges from roughly 33.3% of nurses to about 60% of nurses in South Korea and Japan.  
  - Job dissatisfaction among nurses was close to 20% in most countries and as high as 60% in Japan.  
  - Close to 50% or more nurses in every country lacked confidence that patients could care for themselves following discharge.  
  - Quality-of-care rated as fair or poor ranged
from 11% in Canada to 68% in South Korea. Between one-quarter and one-third of hospitals in each country were judged to have poor work environments. Overall, working in a hospital with a better work environment was associated with significantly lower odds of nurse burnout and job dissatisfaction and with better quality-of-care outcomes.

In the US:
- 33% of nurses reported high burnout.

Work environments were measured with: NWI-PES scores which take into account: staffing-resource adequacy, nursing management and leadership, nurse-physician relationships, nurse participation in hospital affairs, and foundations for quality care.
- In hospitals with poor work environments (0-1 NWI-PES score above national median), the average burnout score was 39.6%.
- In hospitals with mixed environments (2-3 NWI-PES score above national median), the average was 35%.
- In hospitals with better work environments (4-5 NEW-PES score above national median), the average was 27.5%.
- In mixed vs. poor environments on high burnout: the OR was 0.75 (0.71-0.78). In better vs. poor, the OR was 0.56 (0.51-0.61).

Aiken et al. (2010) Level VI
Survey data (correlational, descriptive)

To determine whether nurse staffing in California hospitals, where there are state mandated minimum nurse-to-patient ratios affect nurse and patient outcomes.

- Lower nurse to patient ratios were significantly associated with lower mortality rates in patients.
- When nurses’ workloads were in line with California-mandated ratios in all states, nurses' burnout and job dissatisfaction were lower, and nurses reported better quality of care (29% burnout rate in CA vs. 34% in N.J. & 36% in PA).

Aiken et al. (2008) Level VI
Survey data (correlational, descriptive)

To analyze the net effects of nurse practice environments on nurse and patient outcomes after accounting for nurse staffing and education.

Overall findings: Nurses reported more positive experiences and fewer concerns with care quality, and patients had significantly decreased risk of death and failure to rescue in hospitals with better care environments.

Nurse burnout findings:
- Even after controlling for the effects of care environments, the odds of nurses reporting high burnout increased by roughly 20% with each increase of 1 patient per nurse in mean workloads in hospitals.
- If care environment and nurse staffing are estimated jointly, the effect on nurse staffing on burnout is OR 1.17 (1.09-1.25). If estimated separately, the effect on nurse
<table>
<thead>
<tr>
<th>Study</th>
<th>Type</th>
<th>Sampling Method</th>
<th>Population</th>
<th>Findings</th>
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<tbody>
<tr>
<td>Aiken et al. (2012)</td>
<td>Cross-sectional survey of patients and nurses (Correlational, descriptive)</td>
<td>Included a convenience sample from previous survey of nurses. Sample size: Europe: 33,659 nurses - 11,318 patients - 210 hospitals; US: 27, 509 nurses - More than 120,000 patients - 430 US hospitals; US states included: CA, PA, FL, NJ</td>
<td>To determine whether hospitals with a good organization of care (such as improved nurse staffing and work environments) can affect patient care and nurse workforce stability in European countries</td>
<td>Overall findings: - Improved work environments and reduced ratios of patients to nurses were associated with increase quality of care and patient satisfaction. US findings on effects of nurse staffing and practice environment on nurse outcomes: Burnout: - Unadjusted OR for staffing 1.12 (1.08 to 1.15). - Adjusted (controlling for staffing) OR for staffing 1.03 (1 to 1.06).</td>
</tr>
<tr>
<td>Kutney-Lee et al. (2013)</td>
<td>Survey data (correlational, descriptive)</td>
<td>- Randomized survey of nurses in PA from 1999 (9,345 nurses) and 2006 (5,957 nurses).</td>
<td>To demonstrate how rates of burnout, intention to leave, and job dissatisfaction changed in a panel of hospitals over time, and to explore whether the outcomes were associated with changes in nurse work environments.</td>
<td>Overall findings: - Nurse outcomes improved between 1999 and 2006 with fewer nurses reporting burnout, intention to leave current position, and job dissatisfaction. - Difference models that were run showed improvements in nurse work environments had a strong negative association with changes in rates of burnout ($\beta$=-6.42%, $p&lt;0.01$) intention to leave ($\beta$=-4.10%, $p&lt;0.01$), and job dissatisfaction ($\beta$=-8.00%, $p&lt;0.01$). Burnout and staffing specifically: - Controlling for baseline staffing levels, the % of nurses who reported being burned out in hospitals that improved their staffing levels decreased by nearly 4% when compared to hospitals that did not improve their staffing levels.</td>
</tr>
<tr>
<td>Flynn et al. (2009)</td>
<td>Survey data (correlational, descriptive)</td>
<td>- 1,015 nephrology RNs from 47/50 states were randomly surveyed.</td>
<td>To investigate the effects of workload, practice, environment, and care processes on burnout among nurses in U.S. chronic hemodialysis centers and to determine the association between burnout and intentions to leave their jobs.</td>
<td>A total of 23.3% of RNs reported their workload will cause them to look for a new position. -11.1% reported they were planning to leave their employing facility within the next 12 months but remain with their current employer. An additional 8.2% were planning on leaving their employing facility within the next 12 months. - Respondents reporting the highest workload were 5x as likely to be burned out as RNs reporting lowest workloads. - Respondents who reported 5 or more necessary patient care activities undone during their shift were more than twice as likely to be burned out when compared to those who left no patient care activities undone.</td>
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<tr>
<td>Spetz &amp; Herrera (2010)</td>
<td>Survey data (correlational, descriptive) from 2004, 2006, &amp; 2008 in CA of nurses. - Randomized.</td>
<td>To examine whether there were improvements in the satisfaction of hospital-employed RNs in the mid-2000s after California implemented a RN: patient ratio mandate in 2004.</td>
<td>After controlling for family, job and demographic characteristics, job satisfaction increased 24% between 2004 &amp; 2006.</td>
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<tr>
<td>Larrabee et al. (2003)</td>
<td>Nonrandom sample of 90 RNs</td>
<td>To investigate whether the relative influence of nurse staffing on burnout is 1.21 (1.11-1.31).</td>
<td>General findings: The major predictor of intent to leave was job dissatisfaction, and...</td>
<td></td>
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</table>
Level VI | attitudes, context of care, and structure of care on job satisfaction and intent to leave. | the major predictor of job dissatisfaction was psychological empowerment. Predictors of psychological empowerment were hardiness, transformational leadership style, nurse/physician collaboration, and group cohesion. -Nurses who were satisfied with the amount of time to give patient care, the variety of clinical challenges, and the opportunity to be of service to others and engage in research were 2.4x more likely than other RNs to indicate no intention of leaving their jobs.

Aiken et al. (2001) Level VI | Survey data (correlational, descriptive) from ~4300 nurses from 5 countries. US: 13, 471 nurses from PA. Survey data: 1998-1999 | To obtain information on organizational climate, nurse staffing, and nurse and patient outcomes. | General findings: -Nurses reported similar shortcomings in their work environments and quality of hospital care even with distinctly different healthcare systems. -In US:  
- 41% of nurses were dissatisfied with their jobs  
- 43.2% with scores in high burnout range  
- Only 34.4% said there are enough RNs to provide high-quality care.  
- Only 33.4% said there was enough staff to get the work done.
Appendix B

CONSENT FORM

**Study Title:** The Effect of Implementation of a Nursing Workload Tool on Nurse Burnout

**Researcher:** Nicole Greives, MSN, ANP-BC who is being supervised for this project by Professor Constance Sheets through the Valparaiso University School of Nursing.

**Purpose:** I, ____________________________, understand that I am being asked to take part in a research study about nursing burnout and ensuring patients are in the proper level of care according to their nursing workload.

**Procedure:** The study will consist of a presentation to ICU physicians regarding nursing workload by the researcher as well as education of the nurses regarding the nursing activities score (NAS). There will be subsequent filling out of nursing workload scale by the oncoming/off going nurse shift once in the am daily and the administration of the Maslach Burnout Inventory Tool at the initiation of the study and completion of the study (in approx. 3 months after initiation of study). The NAS scores will be used to assess for appropriateness of patient for the progressive care unit.

**Risks:** There are no physical risks to participating in the study. Other risks include increasing workload through filling out of the forms, which may increase burnout and/or take time away from patients.

**Benefits:** The information provided may help to decrease nurse burnout patient by ensuring patients are in the proper level of care according to both nursing workload and medical acuity. The data gathered could also be used for future projects to help ensure proper workload in the progressive care unit.

**Voluntary participation/withdrawal:** I understand that participating in this study is my choice, and I am free to stop at any time. I also understand that whether or not I choose to participate in the study, there is no effect on any aspect of my job at IU Health.

**Questions:** If I have any questions about being in the study now or in the future, Nicole Greives can be contacted at (317) 367-4071. If I have any questions about my rights as a research participant, I may contact:

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Nursing & Patient Care Services
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**Confidentiality/anonymity**: I have also been assured of anonymity in the reporting of data. Although the information and answers I give will be used and reported by the researcher, my name and other facts that would identify me will be kept strictly confidential. I have also been assured of anonymity in the reporting of data. Both the patients and nurses’ data will be reported as a whole or aggregate without individual identifiers. Only the researcher will have access to the specific individual’s Maslach burnout scores. There will also be a number assigned being assigned for each nurse rather than using names, and the data, once collected, will be kept in the researcher’s home away from the institution.

**Consent to participate in the research study**: I have read or had read to me all of the above information about this research study, the procedure, possible risks, and potential benefits to me, and I understand them. All of my questions have been answered. I give my consent freely, and offer to participate in this study. I also understand that there will be no monetary compensation involved in this study. I also understand that I may keep a copy of the informed consent if I so wish.

________________________  __________________________
Participant signature                  Date

________________________
Researcher signature

Date of IRB approval
Appendix C

Demographic Form for Maslach Burnout Inventory

Instructions:
1. Please answer all demographic questions.
2. All data obtained from this demographic questionnaire will remain confidential and will be used only for the purpose of this EBP project.
3. All data will be reported as an aggregate, not individually.

1. Age: (please choose only one)
   a. 21-30
   b. 31-40
   c. 41-50
   d. 50-over

2. Gender:
   a. Male
   b. Female

3. Highest Level of Education:
   a. Nursing Diploma
   b. Associate’s degree
   c. Bachelor’s degree
   d. Master’s degree

4. Number of years in practice:
   a. 1 year or less
   b. 2-5 years
   c. 6-10 years
   d. 11-20 years
   e. 21-25 years
   f. 25 years or more
5. Race:
   a. Caucasian
   b. African-American
   c. Latin American/Hispanic
   d. Native American
   e. Other
      i. Please specify:

6. Marital Status:
   a. Single
   b. Married
   c. Divorced
   d. Widowed
   e. Other:
      i. Please specify:
## Appendix D

### Nursing Activities Score (NAS)

<table>
<thead>
<tr>
<th>MRN or patient label</th>
<th>Date:</th>
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</thead>
<tbody>
<tr>
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<table>
<thead>
<tr>
<th>Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ 4.5</td>
</tr>
<tr>
<td>☐ 12.1</td>
</tr>
<tr>
<td>☐ 19.6</td>
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<tr>
<td>☐ 4.3</td>
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<td>☐ 5.6</td>
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<tr>
<td>☐ 4.1</td>
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<tr>
<td>☐ 16.5</td>
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<tr>
<td>☐ 20</td>
</tr>
<tr>
<td>☐ 1.8</td>
</tr>
<tr>
<td>☐ 5.5</td>
</tr>
<tr>
<td>☐ 12.4</td>
</tr>
<tr>
<td>☐ 17</td>
</tr>
</tbody>
</table>

### 1. Monitoring and titration: only 1 item can be scored from 1a, b, or c.

<table>
<thead>
<tr>
<th>Item</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a. Hourly vital signs, regular registration and calculation of fluid balance (intake and output.) This should not occur in the MPCU.</td>
<td>☐ 4.5</td>
</tr>
<tr>
<td>1b. Present at bedside and continuous observation OR active for 2 or more hours in any shift for reasons of safety, severity, or therapy, such as adjusting non-invasive mechanical ventilation (CPAP/Bipap), weaning procedures, restlessness, mental disorientation, preparation and administration of fluids and/or medication, assisting in specific procedures.</td>
<td>☐ 12.1</td>
</tr>
<tr>
<td>1c. Present and active for 4 or more hours in any shift for reasons of safety, severity, or therapy such as those above in 1b.</td>
<td>☐ 19.6</td>
</tr>
</tbody>
</table>

### 2. Laboratory: biochemical and micro investigations

<table>
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<th>Score</th>
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<tr>
<td>☐ 4.3</td>
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</table>

### 3. Medication: vasoactive drugs excluded

<table>
<thead>
<tr>
<th>Score</th>
</tr>
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<tbody>
<tr>
<td>☐ 5.6</td>
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</table>

### 4. Hygiene procedures: only 1 item can be scored from 4a, b, or c.

<table>
<thead>
<tr>
<th>Item</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>4a. Performing any hygiene procedures such as: dressing of wounds and intravascular catheters, changing linen, washing patient, incontinence, vomiting, burns, leaking wounds, complex surgical dressing with irrigation, special procedures (e.g. barrier nursing, cross-infection related, room cleaning following infections, staff hygiene.</td>
<td>☐ 4.1</td>
</tr>
<tr>
<td>4b. The performance of hygiene procedures took &gt;2 hours in any shift (day or night).</td>
<td>☐ 16.5</td>
</tr>
<tr>
<td>4c. The performance of hygiene procedures took &gt;4 hours in any shift (day or night)</td>
<td>☐ 20</td>
</tr>
</tbody>
</table>

### 5. Care of drains, all (except gastric tube)

<table>
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<tr>
<th>Score</th>
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<tr>
<td>☐ 1.8</td>
</tr>
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### 6. Mobilization and positioning: including procedures such as: turning patient, mobilization of the patient, moving from bed to chair, team lifting (e.g., immobile patient, traction, prone position) Only one item can be scored from 6a, b, or c.

<table>
<thead>
<tr>
<th>Item</th>
<th>Score</th>
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</thead>
<tbody>
<tr>
<td>6a. Performing procedure(s) up to 3x in 24 hours.</td>
<td>☐ 5.5</td>
</tr>
<tr>
<td>6b. Performing procedure(s) more frequently than 3x per 24 hours, or with 2 nurses, any frequency.</td>
<td>☐ 12.4</td>
</tr>
<tr>
<td>6c. Performing procedures with 3 or more nurses, any frequency</td>
<td>☐ 17</td>
</tr>
</tbody>
</table>

### 7. Support and care of relatives and patients:
including procedures such as telephone calls, interviews, counseling. Often, the support and care of either relatives or patient allow the staff to continue with other nursing activities (e.g., communication with patients during hygiene procedures, communication with relatives while present at bedside, and observing patient) Only one item can be scored from 7a, b, or c.

7a. Support and care of either relatives and patient requiring *full dedication* for about 1 hour in any shift (8 hour time frame) such as to explain clinical condition, dealing with pain and distress, difficult family circumstances □ 4

7b. Support and care of either relatives or patient requiring *full dedication* for 3 or more hours in any shift such as death, demanding circumstances (i.e. large number of relatives, language barriers, hostile relatives.) □32

8. Administrative and managerial tasks: Only one item can be chosen from 8a, b, or c.

8a. Performing routine tasks such as processing of clinical data, ordering examinations, professional exchange of information (e.g., ward rounds). □4.2

8b. Performing administrative and managerial tasks requiring *full dedication* for about 2 hours in any shift such as research activities, protocols in use, admission and discharge procedures. □23.2

8c. Performing administrative and managerial tasks requiring *full dedication* for about 4 hours or more of the time in any shift such as death, organ donation, and/or coordination with other disciplines. □30

Ventilatory support

9. Respiratory support: any form of mechanical/assisted ventilation with or without positive end expiratory pressure, with or without muscle relaxants; spontaneous breathing with positive end-expiratory pressure (e.g., CPAP/BIPAP), with or without endotracheal tube; supplementary oxygen by any method. □1.4

10. Care of artificial airways: endotracheal tube or tracheostomy cannula. □1.8

11. Treatment for improving lung function: thorax physiotherapy, inhalation therapy, incentive spirometry, tracheal suctioning. □4.4

Cardiovascular support

12. Vasoactive medication, disregard type and dose. (i.e. dopamine) □1.2

13. Intravenous replacement of large fluid losses. Fluid administration > 3L/m2/day, which average is approx. 4.8L for women or 5.7L for men. Irrespective of type of fluid administered. □2.5

14. Left Atrium monitoring. Pulmonary artery catheter with or without cardiac output measurement. THIS SHOULD NEVER APPLY TO PCU. □1.7
| 15. | Cardiopulmonary resuscitation after arrest, in the past period of 24 hours (single precordial thump not included): THIS SHOULD NEVER APPLY TO PCU | ☐ 7.1 |
| Renal support | | |
| 16. | Hemofiltration techniques, dialysis techniques. This should not apply to PCU. | ☐ 7.7 |
| 17. | Quantitative urine output measurement (e.g. Indwelling urine catheter) | ☐ 7.0 |
| 18. | Neurological support: Intracranial pressure monitoring. THIS SHOULD NEVER APPLY TO PCU. | ☐ 1.6 |
| Metabolic Support | | |
| 19. | Treatment of complicated metabolic acidosis/alkalosis. | ☐ 1.3 |
| 20. | Intravenous hyperalimentation (TPN) | ☐ 2.8 |
| 21. | Enteral feeding through gastric tube or other gastrointestinal route (e.g., jejunostomy) | ☐ 1.3 |
| Specific interventions | | |
| 22. | Specific interventions: endotracheal intubation, insertion of pacemaker, CARDIOVERSION, endoscopies, gastric lavage, emergency surgery in past 24 hours; routine interventions without direct consequences to the clinical condition of the patient such as: radiographs, echography (echo), electrocardiogram, dressings or insertion of venous or arterial catheters, are not included. | ☐ 2.8 |
| 23. | Specific interventions outside the PCU. Surgery or diagnostic procedures. | ☐ 1.9 |
| Total Score | | |
| **Median number for ICU level score:** 54 | | |

## Was RRT or researcher notified?
- ☐ Yes
- ☐ No (if no, please write why not ie RRT already following patient)

## Did patient transfer to ICU?
- ☐ Yes
- ☐ No

### If patient did not transfer to ICU, does patient meet pulmonary consult criteria? (Continuous CPAP/Bipap or high flow oxygen?)
- ☐ Yes
- ☐ No

~ Any shift refers to any 8 hour time frame in a total 24 hour period based on the original NAS scoring study.

Appendix E

Flowchart for EBP project

- Nas score of 54
- 1. Researcher or RRT notified?
- 2. Patient ICU material?
- If deemed ICU material, phone call by RRT or researcher to primary or ICU physician
- Physician evaluation for possible ICU transfer
- If patient does not transfer to ICU, do they meet pulmonary consult criteria? (Continuous CPAP/ BIPAP or high flow o2/optiflow)
- If yes, then pulmonary consult service is made aware of patient for possible pulmonary consult