RELATIONSHIPS BETWEEN NURSE STAFFING
AND PATIENT OUTCOME VARIABLES

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BY
GARLAND C. VALLEY
DEBRA SIELA, PhD, RN - ADVISOR

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ABSTRACT

RESEARCH SUBJECT: Relationships between nurse staffing and patient outcome variables.

STUDENT: Garland Valley

DEGREE: Masters of Science

COLLEGE: College of Applied Sciences and Technology

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There is considerable debate among researchers on methods of determining key variables used to measure patient outcomes. There is ongoing evidence that more specific outcome measures unique to the nursing profession are needed as nursing practice evolves. The purpose of this study is to assess the key variables used in research and practice regarding nurse staffing and patient care outcomes based on review of literature and from the perspective of an expert panel.

A purposive sample of twenty to thirty nurses specializing in administration, leadership, education, quality management and staff development will participate in a three round Delphi study. The survey will be conducted via the internet and email using a four item nominal Likert scale. The expert panel will rate the importance and usefulness of key variables which have been shown to be directly related to nurse staffing and patient outcomes as well as recommend new variables. This study assesses current evidence based variables and generates new variables from the perspective of a panel of nursing experts. This is a continuation of the study
conducted by Van den Heede, Clarke, Sermeus, Vleugals and Aiken (2007) and will replicate the survey tool used at a local level. Findings of this study will contribute to the ongoing knowledge of quality improvement and measurement of nursing care. This study will also provide nursing professionals with quantitative and qualitative, peer reviewed methods of evaluating nurse staffing, patient outcomes variables and the relationship between them.
Improving patient satisfaction and outcomes of nursing care calls for the increased attention of nursing leaders. With the current national focus on healthcare reform, it is vital that healthcare organizations measure performance and patient satisfaction. The issue of patient outcomes is not specific to clinical practice; healthcare financial administrators are now realizing the importance of patient satisfaction and its impact on the organization (Hall, 2008).

Nurse staffing and patient satisfaction are critical concerns for nurse leaders and administrators as these factors are directly related to nursing management. Quality and outcome measurement are valuable methods of determining the influence of nurse staffing and achieving the desired patient outcome goals. Given the relationship between nurse staffing and quality of care and the correlation between quality of care and patient satisfaction, two concepts stand out as critical elements; nurse staffing and patient outcomes of nursing care. As a predictor of outcomes, it is critical that nursing care is carefully defined (Joseph, 2007).
Problem Statement

Previous quality indicators such as mortality and morbidity have been shown to be inadequate in measuring nursing specific outcomes. Additionally, there is a lack of scientific evidence in support of nurse staffing methods (Schmidt, 2004).

Studies have demonstrated that focusing on patient outcomes, customer loyalty and satisfaction increases revenue. Rush University Medical Center in Chicago estimated that by improving patient satisfaction annual revenue increased by $2.3 million (Hall, 2008). Studies also correlate nurse staffing patterns with patient outcomes. In a study conducted by Boslaugh, Faulkner, Otani and Waterman (2009), multi regression analysis was used to demonstrate attributes that are most likely to influence a patient’s healthcare experience. The findings of the study demonstrated that the two attributes which most influenced patients was (a) overall staff and (b) nursing care (Boslaugh et al., 2009). This study shows that the patient’s perception of the healthcare organization as a whole is highly dependent on the quality of nursing care.

Additional studies have shown relationships between nurse staffing and clinical patient outcomes. In a study conducted by Schmidt (2004) a relationship between the patients’ perception of nursing care and overall perception of the hospital was demonstrated. This study also demonstrated that nursing care had a direct impact on each outcome in the model, outcomes being defined as the desired or decisive results of the organization.
Background and Significance

The current nursing shortage threatens staffing numbers and quality of care. The nursing workforce is projected to decrease by 260,000 by the year 2025. Conversely, the healthcare industry continues to grow, hospitals, long-term care facilities and ambulatory care clinics added 21,000 new jobs in June of 2009 alone (Rosseter, 2008). With nursing care being a primary factor in patient satisfaction and little relief from shortages, nursing leaders are compelled to establish methods of measuring staffing effectiveness. Identifying nursing specific patient outcomes and staffing patterns and continuous quality improvement by measurement of variables allows for more decisive and efficient nurse staffing patterns.

The Joint Commission (JC), a recognized leader in quality of care, has established proven methods of identifying, testing and specifying performance measures. The development of the ORYX measures in July 2002 allowed hospital to collect and measure core clinical data directly related to patient outcomes. The ORYX core measurement system, however, does not specifically identify nursing sensitive measures but organizes them by diagnosis (The Joint Commission [TJC], 2009). The ORYX core measures does allow nursing administrators and managers to select and monitor measures, which they believe to be related to nursing care as quality indicators. By design, the ORYX performance measurement system is intended to be standardized in order to apply to healthcare organizations globally (TJC, 2009). A similar system is needed which focuses specifically on nursing sensitive patient outcomes. Ongoing study on nursing specific performance measurement systems is essential in the current healthcare environment.
As a model for performance measurement TJC ORYX system can be applied to a nursing specific set of measures. The ORYX core measurement system is built upon strict criteria to be considered as a measure of performance and the system evolves over time with continuous testing (TJC, 2009). Reliable variables or measures are needed to create a core measurement system. To be reliable, these outcome measures are evidence based as well as peer reviewed and have global significance.

Previous studies have shown that a shortage of registered nurses and increased workload has the potential to threaten patient care. The study estimates that by adding one FTE RN per patient day was could save fives lives per 1000 patients (Agency for Healthcare Research and Quality, 2007).

Innovative approaches to quality management have been slow to develop within healthcare institutions. Even more importantly, nursing specific quality management is lacking (Barbour, 2001). An article published in the April 2009 edition of Nursing Times demonstrates that the issue of nursing care quality is an international concern. British healthcare professionals have recently included nursing in their newly developed National Quality Board. The board consists of twenty-one expert and lay persons with the purpose of developing quality initiatives, assessment and benchmarking (Clews, 2009). Professor of Nursing, Hilary Schofield, and Chief Nurse of the Sheffield Teaching Hospital was appointed to the board and stated that “nurses were crying out for a system which clarifies quality and how it can be measured” (Clews, 2009, ¶ 8) and stresses the importance of measuring quality of care to determine the success of nursing intervention.
In order to implement a nursing specific quality initiative, the methods and variables to be measured must be established first. By defining the relationship between nurse staffing and patient outcomes, organizational management can change and institutional quality improvement can begin (Barbour, 2001). Previous studies clearly demonstrate that nurse staffing patterns influence patient satisfaction, a subjective outcome (Boslaugh et al., 2009). The improvement of patient satisfaction has a direct organizational impact. In an article by Hall (2008), hospitals with high patient satisfaction levels were more fiscally successful. For a hospital with annual revenue of $120 million, improved patient satisfaction generates an additional $2.2 million to $5.4 million in additional annual revenue (Hall, 2008).

Purpose

The purpose of this study is to identify measurable nursing human resource utilization and patient outcome variables and to demonstrate a relationship between nurse staffing patterns and patient outcomes. This is a replication of the study Aiken, Clarke, Sermeus, Van Den Heed, and Vleugals (2007). The findings of this study are intended to assist nurse leaders in making decisions regarding effective staffing patterns which result in increased patient satisfaction and positive clinical outcomes.

Research Questions

1. What are the relationships between nursing human resource issues and healthcare quality based on both empirical findings and expert opinion?

2. Of the connections between nurse staffing and patient outcomes, which are the most significant indicators of quality of nursing care?
3. How are staffing variables, patient outcome variables, and background variables currently used to evaluate quality of nursing care defined?

4. What additional reliable variables can be identified through review of literature and expert opinion?

**Conceptual Model**

The framework is based on a previous study by Aiken et al. (2007), which states that there is an association between hospital nurse staffing and the patient outcomes of nursing care across hospitals and countries. The conceptual model is derived from the fourteen constructs related to nurse staffing patterns, patient outcomes, environmental and organizational/environmental influence. The assumption is that there are specific patient outcomes which are sensitive to and dependent on delivery of nursing care as well as organizational/environmental factors. The conceptual framework is also defined by the relational statement that nurse staffing patterns have a direct impact on patient outcomes, quality of care and patient satisfaction.

**Definition of Terms**

*Conceptual:* Nurse staffing is defined as factors directly related to nurse to patient ratio, nursing skill mix, academic preparation, specialized training, and experience. Nurse staffing is dependent upon staffing patterns and composition which influence the workplace culture and impact the ability of the nurse to provide adequate care.

*Conceptual:* Patient outcomes are defined as the subjective and objective outcome of applied nursing care by professional registered nurses. Patient outcome variables are sensitive to and dependent upon the quality of nursing practice and nurse staffing variables.
Conceptual: Background variables are defined as patient, nurse and organizational/institutional factors which have an indirect impact on the relationship between nurse staffing and patient outcomes but not unique to either category.

Operational

Nurse staffing patterns are related to patient outcomes and patient satisfaction. Patient satisfaction is related to survival of healthcare organizations. By determining these relationships, nursing leaders can effectively develop effective staffing plans. The relationships between nurse staffing and patient outcomes will be measured by the Delphi approach. Consensus is demonstrated by a panel of experts by a specific benchmark of 85%. (Aiken et., 2007). The variables to be measured are derived from literature review and evidence based inquiry.

The study variables are of three types: eleven nurse staffing, forty-two patient outcome and thirty-five background variables selected from previous studies and literature review. Nurse staffing variables are categorized into two types: the number of nursing personnel to patient volume and skill mix. Patient outcome variables are restricted to only those considered sensitive to nursing care, as demonstrated by previous research, not necessarily to overall quality. Eleven nurse staffing variables in three subcategories: (a) nursing staff to patient volume; (b) staffing plan, type of staff; and (c) skill mix.

Patient outcome variables are both clinical and subjective with a concentration on patient satisfaction. Forty-two patient outcome variables in seven subcategories:
(a) medical surgical; complications; (b) infection control; (c) patient safety (d) utilization management; (e) comfort and wellness; (f) subjective outcomes; and (g) objective outcomes.

Background variables are considered vital to accurate correlation and may be related to both nurse staffing and patient outcomes. Thirty-five background variables in four subcategories: (a) patient characteristics; (b) nurse characteristics; (c) organizational systems; and (d) organizational characteristics.

**Operational:** The definition of the nursing personnel is defined by the following criteria:

1. Registered or professional nurse (RN): has completed minimum post-secondary education, passed the RN licensure exam, and currently licensed in accordance with applicable laws.

2. Licensed or secondary nurse (LPN): has completed a shorter specialized educational program, commonly one year, passed a LPN licensure exam and currently licensed in accordance with applicable laws.

3. Unregulated or unlicensed nursing personnel: includes nursing assistants, nurse aides and healthcare attendants who have completed some type of training in a hospital or certificate program.

**Limitations**

Limitations of this study are the small purposive sample size as well as the local study setting. Additional limitations include the arbitrary selection of 85% as a measure of consensus.
Assumptions

There is a strong relationship between nursing human resource utilization and nurse staffing. The patient outcomes of nursing care are related to patient satisfaction. These concepts can be measured to improve quality and efficiency by identifying specific variables and measuring the relationships between variable.

Summary

There is considerable debate among researchers on methods of determining key variables used to measure patient outcomes. There is ongoing evidence that more specific outcome measures, unique to the nursing profession, are needed as nursing practice evolves. The purpose of this study is to assess the key variables used in research and practice regarding nurse staffing and patient care outcomes based on review of literature and from the perspective of an expert panel.

Previous studies confirm that the quality of nursing care has a significant impact on patient satisfaction which directly impacts the survival of healthcare organizations. This study intends to demonstrate evidence based and peer reviewed relationships between nurse staffing patterns and patient outcomes.
Chapter II

Review of Literature

Introduction

Monitoring and evaluating the quality of patient care provided by nurses is a critical aspect of the nursing profession. Measuring patient satisfaction and the outcomes of nursing care is an ongoing and perpetual process as the nursing profession changes and evolves with the healthcare industry. Immediate concerns, such as the global nursing shortage, limited nursing program enrollment and limited nursing school admissions directly impact the quality of care provided to the public. The American Nurses Association (ANA) estimates that the shortage of registered nurses (RNs) could reach as high as 500,000 by the year 2025 and that 30,000 more nursing graduates are needed per year to replace the aging workforce who are close to retirement (Rosseter, 2008).

Patient satisfaction is also a serious quality concern as the patient’s perception of the quality of care effects patient’s perception of the organization as a whole. Patient satisfaction rises to importance when considering the current healthcare industry with rising patient expectations and decreasing reimbursements. Measuring patient satisfaction is critical for organizations pursuing high performance and essential for survival in today’s healthcare marketplace (Messina, 2009). This study evaluates the concepts of
patient outcomes and nurse staffing and identifies related independent and dependent variables.

Organization of Literature

The literature review is separated into five sections: (a) conceptual framework; (b) measuring nurse staffing and patient outcome variables; (c) defining nurse staffing variables; (d) defining patient outcome variables; and (e) defining background variables. The review of literature establishes the evidence based foundation for identifying measurable nurse staffing and patient outcome variables and examining relationships between them.

Conceptual Framework

The framework of the proposed study is based on the previous study by Aiken, et al. (2007), *International Experts Perspectives on the State of Nurse Staffing and Patient outcomes Literature*, which states that there is an association between hospital nurse staffing and the patient outcomes of nursing care across hospitals and countries. The conceptual framework is a working hypothesis derived from the concepts nurse staffing and patient outcomes and that there are specific patient outcomes which are sensitive to and dependent on nursing care. The conceptual framework is also defined by the relational statement that nurse staffing patterns have a direct impact on patient outcomes and quality of nursing care.

Measuring Nurse Staffing and Patient Outcomes

To accurately define variables, a reliable method of identifying them must be established. In addition to identifying variables, they must also be measurable. Measurable variables will yield more reliable quantitative data. Variables are concrete
concepts that are measured, manipulated or controlled. (Burns & Grove 2005). The variables in this study are obtained from the framework and findings of previous studies particularly those identified in the study by Aiken et al. (2007). Additionally, this study identifies variables more abstract and based on expert opinion.

Current variables used in research to measure the relationship between nurse staffing and patient outcomes are not adequate to determine quality of nursing care and patient satisfaction. The purpose of this study was to assess the key variables used in research on nurse staffing and patient outcomes from the perspective of an international panel and develop new quality of care measures. This study is the model on which this proposal is based. The problem statement is succinct without being trivial as it describes the current controversies and inconsistencies in the measurement of nurse staffing and patient outcome. The problem identifies variables and outcome measures as the focus of the study and further explains the need to create a broader set of measures to better capture the quality of nursing care in hospitals. The research purpose is directly significant to nursing practice because the goal was to review current variables and develop a comprehensive set of variables for future research. The research problem and purpose are without bias and gender neutral as the study relates to methods of data extraction and the adequacy of these methods rather than research subjects.

The study framework is not directly stated in the literature; however, this does not detract from the significance of the study. Theoretical subtraction is possible through the identification and description of the construct, nursing care and the concepts associated with nursing care; nurse staffing, patient outcomes and background variables. The research question is not directly stated but implied through the study objectives and
conclusions of the study. The implied research questions can be summarized as: (a) What are the connections between nursing human resource issues and healthcare quality based on both empirical findings and expert opinion; and (2) Of these connections, which are the most significant indicators of quality of nursing care?

Further research questions are separated by the three main categories of interest:
(a) What are the nurse staffing variables, patient outcome variables, and background variables currently used to evaluate quality of nursing care; and (b) Can additional variables be identified through review of literature, expert opinion and current empirical data? These questions and objectives are logically linked to the research purpose and framework which is to review current nurse staffing and patient outcome literature and to develop new more nursing related outcome indicators while eliminating those considered as insignificant.

The population and sample selected for this study was purposive rather than random and were nominated by the research team and the European Nurses Association. Criteria included professional backgrounds and education status as subject matter experts. The population consisted of a 39 researchers of which 32 consented to participate in the panel (Aikin et al., 2007). Out of the total sample 24 specialized in nurse staffing and quality of healthcare and eight executive nurse administrators from 10 different countries for a sample of 32 (n=32).

The sample consisted of 20 Registered Nurses with Doctoral degrees, four with Masters Degrees and 8 nurse executives, one with a doctoral degree and seven with Masters degrees. The study does not specify criteria used in selecting the expert panel
other than nomination and being considered subject matter experts by peers and colleagues.

The study used rating surveys and open-ended questionnaires to collect data on the variables identified in the initial literature review process. The survey process was carefully controlled by the Delphi approach which is recommended for review of areas of knowledge where methodologically rigorous research evidence is limited and experts disagree on the interpretations (Campbell, Braspennings, Hutchinson, & Marshall, 2003). The use of the Delphi technique can be beneficial as it allows for a group to collaborate without personal interaction using this method the opinions of others cannot be altered by the persuasive influence. This study used a classic Delphi survey which is intended to reach consensus regarding the current methods of evaluating nurse staffing and patient outcomes.

The survey consisted of 39 patient outcomes, 14 nurse staffing and 31 background variables and was presented to the expert panel by email. The validity of each variable was initially verified by the research team and the wording was carefully scrutinized to be understandable by the international panel. A nominal Likert scale (1-4) rating method was employed to rate the variables in each of the three categories of interest (Aiken et al., 2007).

The results are presented in both text and table format and include detailed statistics of each of the individual variables including percentages, probability and consensus levels. This information although essential to the overall study is arduous to interpret but is valuable as statistical data for use in future research. The data analysis addresses the study design in that the results show a definite consensus among the
panelists regarding specific variables that indicate a relationship between nurse staffing and patient outcome. As a descriptive design, the results do not require evidence of causality or correlation but are successful in making judgments regarding current nurse staffing practices and identifying potential problems with current practice.

The study successfully provides details of the findings relating to each variable and which of these reached the 85% consensus considered to be significant as an indicator of quality of care from the perspective of the expert panel. The Delphi panel generated 7 patient outcome, 2 nurse staffing and 12 background variables in round 1 that were not previously well investigated in the preliminary literature search.

Round 2 produced an 85% consensus of 32 patient outcomes, 10 nurse staffing measures and 29 background variables. The highest consensus levels regarding measure of sensitivity to nurse staffing were found for nurse perceived quality of care, patient satisfaction and pain, and the lowest for renal failure, cardiac failure and central nervous system complications. Nursing hours per patient day received the highest consensus score as a valid measure of the number of nursing staff. As a skill mix variable, the proportion of RNs to total nursing staff achieved the highest consensus level. Age and co morbidities of patients also received high ratings as important background variables (Aiken et al., 2007).

The panel tended to agree that associations existed between nurse staffing and patient outcomes variables, the literature review was also consistent with this conclusion. The panelists were not convinced of the sensitivity of six patient outcome variables to the number of nursing staff that were considered as significant in the literature review. These variables were unplanned extubation, reintubation, and length of stay, length of ICU stay,
timely blood collection, and timely antibiotic administration. This inconsistency may be a result of the nature of the medical specialties in which many of these procedures are performed rather than broader patient populations.

Several significant points were presented by the panelists is that positive patient outcomes that are presumed to be less common under lower staffing conditions should be used more frequently in this area of research. Additionally, all of the literature and data collected that was used to compile the initial lists of variables is available in current literature and electronic sources. This data should be made available as a database for institutions or hospital facilities who may wish to conduct further research on these subjects, but have a limited budget for this purpose (Aiken et al., 2007).

In general, this study provides a current overview of the state of available literature on the state of the science of nurse staffing and patient outcomes research as of 2005. The results of this study describe an area of nursing science still evolving and provide current and future researchers with a clearer understanding of the associations and relationships between the utilization of nurse staffing resources and quality of healthcare from both empirical findings and expert opinion.

In a study by Barr, McSweeney, Potter, and Sledge (2003), the establishment of baseline data is demonstrated. The relationship between the number of RN hours and patient outcomes has been a heavily discussed topic. Currently, due to staffing shortages and impending RN retirement, this topic has become a very significant subject as it directly affects patient care and patient satisfaction. By establishing baseline data and measurable variables regarding RN workforce and patient outcomes, a healthcare organization can better monitor the impact of organization and nurse staffing changes.
The purpose of this study by Barr et al. (2003) was to establish baseline data defining the existing relationships between staffing and patient outcomes to assist healthcare organizations objectively make decisions related to staffing allocation and address JCAHO and ANCC Magnet standards for hospital staffing. Additionally, in order to more accurately determine hospital costs and utilize human resources, it is necessary to measure the patient outcome benefits of RN staffing levels.

The study addresses the research question: “What is the relationship between RN staffing patterns and patient outcomes?” The study framework is not explicitly stated however theoretical substruction is possible as a prospective correlation study design. The concepts nurse staffing and patient outcomes are directly stated and the conceptual model; RN staffing has an effect of patient outcomes, provides the theoretical basis (Burns & Grove, 2005).

The setting of this study (Barr et al., 2003) was inpatient acute care nursing units which employed RNs, unlicensed assistive personnel and LPNs. A one month pilot study was conducted to determine if other units should be included. The pilot study demonstrated that it was difficult to link a particular nursing intervention with a specific outcome and the variables were too numerous in multiple care settings. The formal study was then isolated to acute care units and spanning a 1 year period. The population included 1000 medical units composed of acute care, ambulatory care, intensive care, and emergency departments. The final sample was reduced to 32 acute care units (n=32).

Two sets of data were collected in the study, RN staffing data and patient satisfaction and outcome data. Nurse staffing data was calculated by the number of 8
hours shifts worked by RNs in relation to the number of hours worked by non-RN nursing staff. This number was then converted to a percentage and eventually aggregated over the 1 year period. Patient satisfaction data was collected by using the hospitals existing discharge survey.

The study methods were prospective correlation by comparing the time periods with the highest number of RN staff in proportion to non-RN staff and the results of patient discharge surveys. In addition to survey results, the number of adverse events was compared to the number of RN hours (Barr et al., 2003).

This study used two variable sets, one for staffing and a second for patient outcomes. Multiple regression was used to determine the contribution of staffing variables to patient outcome measures. The Independent was variable. Nurse staffing which encompasses measure of RN hours per patient day and dependent variable, patient outcome measures. Patient outcome is defined in the study as whatever happens to the patient including the patient’s health status, functional status, quality of life and presence or absence of illness.

The instruments used included; survey, data collection from adverse event documentation. The resulting significant predictors of staffing variables to patient outcome was that the percentage of RN hours per patient day was significant in predicting the patients perception of pain or a decrease in patients subjective perception of pain when there was a higher number of RN per patient hours. R2=.210 (p= <.05)The percentage of RN hours per patient day was a significant predictor of the patients perception of self-care ability and overall health status, and an increase in the patients subjective perception of ability to care for own health needs and general wellness. The
**VAS measure variable** was: importance $R^2=.342$ ($p<.05$), understanding $R^2=.342$ ($p<.05$) (Barr et al., 2003).

The higher the percentage of RN hours per patient day resulted in higher overall satisfaction with the health care experience in 5 of the 7 post-discharge measures. $R^2=.265$ ($p<.05$). This method of analysis was used in this study as the researchers were concerned with predicting the patient outcomes related to nurse staffing levels. Multiple regression analysis is used when there are multiple independent variables and dependent variables. In this study, there were multiple independent variables including percentage of RN staff, patient acuity and patient care hours per day. The researchers’ goal was to show the significant predictors in relation to the dependent variables (Barr et al. 2003).

The study demonstrated that the number of RN per patient hours was positively correlated with overall patient health status and five of the seven variables in post discharge satisfaction. The study demonstrated a negative correlation between the patient’s perception of pain and self-care ability. Conclusion of the findings stated were interpreted that a higher overall number of RNs per patient day was related to overall positive health and the less RN staff was associated with subjective patient comfort e.g. perception of pain and the patients subjective ability to care for themselves.

In the current healthcare industry in which patient safety, patient satisfaction and cost containment are essential for survival, specific methods of performance measurement are needed. Additionally, hospital restructuring has raised concerns about RN staffing and patient outcomes. The purpose of the study was to present a replicable methodology for designing and analyzing a large ongoing and valid quality database.
specific to nursing. In the past the majority of quality data sources derived from billing and scheduling databases, administrative records or questionnaires.

In this study by Aydin, Bolton, Donaldson, Brown, Buffum, Elashoff, and Sandhu, M (2004), a specific methodology of measuring nursing quality that can be replicated by multiple facilities is developed and tested. The research question is not directly stated but can be formulated from the research purpose which is to create a regional database to be used by multiple organizations to develop a performance measurement program. The question being; can a regional database be created and can multiple organizations use it to measure nursing quality? The study occurred in California and was open to all California acute care hospitals, out of this population 139 hospitals (37%) participated in the study.

Data was collected using the CalNOC data base which required specific data entry methods and can be used to analyze data submitted. The 139 hospitals were asked to submit specific data defined by indicator statements to the CalNOC database by electronic submission. Threats to reliability and validity were a major concern in the data collection process. Validity and reliability were maintained through research based indicator statement selection and refinement process. Variables are submitted on an individual, unit and organizational level. Each variable is trended over time and specific patterns are identified. The results of trending the variables guides the method of data analysis (Aydin et al., 2004).

The study successfully developed a quality and performance measurement system with evidence based indicators. The database and methods of analysis can be considered reliable and valid as stringent steps were taken in the data collection process to ensure
integrity. The system provided the California hospitals with the resources to measure nurse-sensitive care, evidence based decision support and the potential for future benchmarking for patient care. The database also provides researchers with additional data for further study on nurse staffing and patient outcomes (Aydin et al., 2004).

*Nurse Staffing Variables*

For the purposes of this study, the operational definition of nurse staffing is factors directly related to nurse to patient ratio, nursing skill mix, academic preparation, specialized training, and experience. Nurse staffing is dependent upon staffing patterns and composition which influence the workplace culture and impact the ability of the nurse to provide adequate care. Review of literature identifies current variables related to nurse staffing as defined by RN to patient ratio, staffing skill mix, workload, and nursing staff turnover.

In a study conducted by Gruber-Baldini, Konrad, Park, Sloane, Stearns, and Zimmerman (2007), the unique nurse staffing characteristics of assisted living facilities (ALF) was examined. Residential care (RC) has been increasing in popularity over nursing home. The nursing staff intensity and skill mix have not been adequately evaluated in this setting. Residents of ALFs tend to have less health problems than long term nursing home residents; however, they do have chronic and acute healthcare needs. Medication management requires the skill of trained nurses, while skilled assessments and care require the skills of RN’s. Activities of daily living (ADLs) require less skilled nursing care and can be accomplished by licensed practical nurses or nursing assistants. This study addresses the relationships between nursing skill mix and nursing intensity as an indicator of patient care quality in RCs and ALFs.
The research questions implied in this study are: (a) Is the current staffing skill mix appropriate for the acuity and healthcare needs; and (b) Can the relationship between nursing intensity and patient outcomes be used as a quality indicator? The study setting was multiple assisted living facilities in Florida, New Jersey, Maryland, and North California. The study was designed to represent equal numbers of both RC facilities and ALFs. The total sample consisted of 40 residents in 77 RC and ALF. This study relied on previous data collected by the Collaborative Studies of Long –Term Care (CS-LTC), a four state study on RC/AL, and new data collected. The data collected includes measures of the following variables; staffing intensity and skill mix; and resident outcomes in relation to staffing intensity and skill mix. Analysis of data provided descriptive information related to nurse staff hours per day, care hours per resident per week and the percentage of total care hours provided by licensed staff. Longitudinal analysis was used to assess resident level data and determine the relationship between nurse staffing and the incidence of mortality, nursing home transfer, hospitalization, and incident morbidity. Resident level regression analysis was conducted to determine if staffing skill mix and intensity were related to patient outcomes.

Findings showed that all 77 facilities had an RN available, but 70% had only unlicensed assistive staff providing direct care. The total mean direct care hours per resident per week ranged from 0.87 to 1.80. The facilities with a higher number of RNs providing direct care were among the lowest in direct care hours. Facilities with only unlicensed assistive staff providing care had the highest direct care hours per week (Gruber-Baldini et al., 2007).
Resident level data showed that patient outcomes were not significantly associated with the total number of direct care hours per day, but where there was a higher proportion of licensed staff providing direct care there was a lower incidence of negative patient outcomes, such as hospitalization. A 10% increase in licensed nursing staff was associated with a 4.4% decrease in incidence of hospitalization. The risk for mortality, morbidity and nursing home admission showed a marginal decrease with a higher proportion of licensed nurses to unlicensed assistive staff (Gruber-Baldini et al., 2007).

As a result, the researchers concluded that in respect to skill mix total LPN care hours were nearly the same as LPN and RN combined suggesting that in an RC/ALF RNs and LPNs may be very close substitutes. The most significant finding was that facilities with a higher number of licensed staff providing direct care had fewer hospitalizations. The benefits of decreased hospitalization include better quality of life and lower medical expenses. The lack of association between staffing numbers and patient outcomes suggests that more staff can better manage illness however a staffing skill mix with higher licensed staff prevents illness.

High nurse turnover is troubling for many healthcare facilities, consequences include a decrease in continuity of care, additional costs related to recruitment and training and staffing levels. Castle, Hawes, Kash, and Naufal, (2006) examined the relationship between nursing staff turnover and nurse staffing. The purpose of this study was to examine the market-level characteristics of high turnover rates and staffing levels in nursing homes. This study identifies specific nurse staffing variables which are confirmed by qualitative study. Research questions cited in the study included: (a) What
are the factors associated with staff turnover? and (b) What is the impact on nurse staffing and patient care quality?

The study was conducted in Texas nursing homes, which were staffed with RN’s, LVN/LPNs and nursing assistants (NA). The patient cohort involved in the study was non-acute geriatric long term care residents from 1,017 nursing homes listed in the Texas Nursing Facility Medicaid Cost report. Nursing homes were not included in the study, if they had a low census or if they had been in operation for a short time. The sample consisted of 1,014 facilities out of the total population of 1,017 (Castle et al., 2006). Hospital-based facilities were not included as this would present an entirely different population.

The dependent variables measured were: (a) direct care staffing levels and (b) staff turnover rate. Data collection methods included measurement of the number of nursing staff from the beginning to the end fiscal years. This method of data collection was recommended by the Bureau of Labor statistics as the number of total separations (Castle et al., 2006). All staff counted was direct care nursing staff.

The instrument of measurement used were tests of endogeneity and variability, the ordinary least squares (OLS) and two-stage least squares (2SLS). These instruments are designed to identify facility specific variables that may vary among facilities. Additionally, the F test was used to test the significance of instrumental staff turnover variables and then evaluated these variables as predictors of nurse turnover.

Findings of the study focused on the effects of staff turnover on nurse staffing and the market effects from an administrative perspective. The OLS and 2SLS tests
demonstrated that staff turnover was highly endogenous. The tests were applied to three staffing models, yielding the same results.

The results of the study were successful in predicting variables for staff turnover among LPNs and NAs, but not for RNs. However, additional variables were identified. One finding was that in Texas hospitals for profit organizations had a higher turnover rate than not-for-profit facilities. The study did not explain RN turnover rates successfully. The study concluded, however, that high RN turnover rates were a significant predictor of high NA rates. LPN turnover was determined to be mostly due to market factors. This finding confirms that it is essential nursing management develop specific initiatives to identify BOS in nursing staff to reduce RN and NA turnover rates.

Although the final results of the study did not completely answer the research questions, the results did generate additional valuable findings, such as the determinants of LPN and NA turnover rates. The researchers concluded that the subject of identifying determinants of high RN turnover rates warrants further investigation. In conclusion, severe BOS was frequent in ICU nurses and nursing assistants. Conflicts with physicians, colleagues and families were highly associated with BOS. These conclusions suggest that research related to communication and conflict management are effective methods of managing BOS in ICU nursing staff (Castle et al., 2006).

Nursing staff turnover rates in nursing homes continues be a major concern for nursing leaders and administrators. Its effect on quality of care has been extensively studies and continues as the healthcare industry involves previous studies have demonstrated that annual nursing assistant turnover is nearly 100% (Castle et al. 2006).
There is an urgent need to develop comprehensive staff retention strategies to decrease turnover and improve retention.

In this study Graham, Hegemen, Henderson, Meador, Pillemer, and Schultz (2008), nursing staff turnover rates are examined by developing and evaluating a Nurse Retention Specialist (RS) role. The controlled evaluation study tested the effects of a model for a RS and to show research evidence that justified the development of a specialist in retention. The conceptual framework originates from theory as well as empirical research.

The study setting was 30 residential nursing homes sampled in a random stratified manner and the design was both quantitative and qualitative. The facilities were in New York and Connecticut. 30 registered nurses from each facility were designated to fulfill the RS role. The dependent variable, nursing assistant turnover rates and the independent variable, development of a retention specialist were measured in a randomized, controlled intervention study. The inclusion criteria for the study was that each facility would select an existing RN who would be trained in evidence based program and devote at least 20% of each day implementing the RS program (Graham et al., 2008).

Data was collected over a 1 year period in 30 nursing homes by nursing assistant interviews and turnover rates were measured annually using guided self-reporting methodology. Review of literature established the basis for the 3 day RS program training. The training focused on previous studies related to; the impact of turnover on staffing, such as efficiency, morale, stress burnout, and economic. The research tool consisted of simple questionnaires administered to nursing assistants (Cohen-Mansfield, 1995).
The findings of the study supported the development of a retention specialist in that there was a positive effect on staff turnover rates. In addition to a decrease in nursing assistant turnover staff member’s questionnaire responses showed an improvement in the perception of overall quality, retention efforts, and job satisfaction. The study did not find treatment effects on all outcome variables some the effects were marginal. Participation in the study was also related to the size of the facility, smaller facilities tended to have less financial resources to invest in a specialist program (Graham et al., 2008).

The researchers concluded that two program modifications were needed, additional educational sessions for the RS and the opportunity to discuss challenges and accomplishments in the role with other RS involved in the study. This research has potential for future study, specifically further examination of patient outcome variables related to staff turnover and the implementation of a retention program.

*Patient Outcome Variables*

For the purpose of this study the operational definition of patient outcomes are the subjective and objective outcomes of applied nursing care by professional registered nurses. Patient outcome variables are sensitive to and dependent upon the quality of nursing practice and nurse staffing variables. The review of literature related to patient outcomes focuses on the concepts, quality of clinical care, and the nurse’s and the patient’s perceptions of patient satisfaction.

The quality of nursing homes has long been one of the most critical concerns to the public. With nursing care under such scrutiny, it is critical that nurse staffing mix and its relationship to patient outcomes. In a recent study conducted by Greene, Harrington, Hongsoo (2009) related to nurse staffing, RN staffing mix is examined as a variable
which has direct impact on patient outcomes. The purpose of this study is to identify and qualitatively define the relationship between RN staffing mix and quality of care in nursing homes. The research questions of the study are implied through the purpose: What is the relationship between RN staffing mix and patient outcomes? What recommendation can be made to improve the quality of patient care?

The population consisted of 1099 California nursing homes out of which a sample of 411 facilities met the criteria for inclusion. The 411 facilities were separated into two groups with 201 facilities, which consistently met the state’s minimum nurse to patient ratio and 210 facilities that did not meet the minimum nurse to patient ratio. The sample was further separated into two subcategories; facilities that did exceptionally well meeting nurse to patient ratio standards and the facilities which scored the lowest (Greene, 2009).

Data was collected in a retrospective panel data study of the two groups of California nursing homes. The study data was retrieved from two primary sources; the California long term care annual cost report and the California Department of Health Services. The sources yielded quantitative data over a five year period on nurse staffing levels and nurse to patient ratio. The Automated Certification and Licensing Administrative Information and Management System (ACCLAIMS) database was used to obtain deficiency data on each facility. The ACLAIMS database includes information directly related to quality of care, such as survey results, audits, complaints, citations and penalties (Greene, 2009).

This study is significant as it establishes a precedent in identifying and defining variables sensitive to nursing care. Deficiency records are one of the few ways nursing
homes demonstrate compliance with regulatory agencies. The researchers were able to establish a reliable data set of variables derived from deficiencies as well as serious occurrences, such as patient abuse and negligence.

The findings of the study demonstrated that a higher RN staffing mix was positively correlated with better patient outcomes and that this positive outcome was negatively affected by overall staffing numbers. Further study on the unique contributions of RNs in nursing homes is recommended. This study, however, provides valuable data regarding nurse staffing patterns and the correlating patient outcomes over a significant period of time. The study further identifies evidence based patient outcomes variables which are important for establishing a reliable basis for measurement.

Patient participation in clinical decision making is crucial to patient-centered care. The ability of the patient to make choices regarding his/her medical care is largely dependent upon nursing care and education. Patient involvement in clinical decision making is an important component of patient satisfaction and nursing practice. The patient’s perception of the amount of control they have over own medical care in relation to the direct impact of quality of care. There is limited knowledge about patient preferences for participation as well as how nurses perceive their patients needs. The purpose of this study was to examine the concordance between the patient’s perception of their level of involvement in clinical decision making and how nurses perceive the patients preferences (Ehnfors, Ehrenberg, & Florin, 2005).

“What role do patients have in the clinical decision making regarding their own care?” The research questions posed in this study were aimed at demonstrating the role that patients have in their own care. Emphasis is now placed upon self care to promote
autonomy and health. Using a comparative study design, nurse-patient interactions were examined in the setting of an infectious disease ward in a Swedish hospital. The sample consisted of 80 nurse-patient dyads (n=80) as the study was focused upon the perceptions and interactions of the patient and the nurse (Ehnfors et al., 2005).

Data was collected by nursing admission and discharge assessments, and patient preference surveys. Patients were given a preference card and were asked to select the letter corresponding to their most preferred role to least preferred role in clinical decision making on their own care. The choices were the letters: A, B, C, D, and E. The five letters and possible permutations created an ordinal scale to rate the degree of involvement the patient preferred from passive to active roles. The ordinal scale instrument for measuring degree of involvement was a modified version of the Control Preference Scale (CPS), a card sort technique. The validity of the instrument had been demonstrated in previous similar studies on patient satisfaction nurse (Ehnfors et al., 2005).

The study revealed that patients desire less involvement in medical decision making than the nurses perceived them to be. RNs in the study tended to overestimate the patients involvement and decision making suggesting that RNs are not always aware of their patients’ perceptions and preferences. Additionally, some patients took a more passive role when their preference was to assume an active role (Ehnfors et al., 2005). Establishing a qualitative method of determining patient perception is necessary in identify meaningful patient outcome variables.

In a study by Ganey, Messina, Scotti, and Zipp (2009), patient satisfaction is correlated with admission volume and hospital type. In today’s competitive healthcare
system, performance excellence can mean the difference between survival and failure. Healthcare executives need to have a better understanding of the relationship between patient satisfaction and admission volume. The purpose of the study was to develop recommendations for strengthening patient satisfaction and organizational performance.

The study is developed on the framework that patient satisfaction is related to admission volume, and admission volume is directly related to revenue and business survival for a healthcare organization. This study is driven by two distinct research questions: (a) What is the nature of the relationship between patient satisfaction and inpatient admission volume in acute care hospitals; and (b) Does the relationship between patient satisfactions differ between teaching and non-teaching hospitals?

Data collection occurred in the setting of New Jersey acute care hospitals. The hospital population was all acute care teaching and non-teaching hospitals. Hospitals within the population were asked to consent to participating in the study by submitting admission, discharge and patient satisfaction data. Out of this population, a final sample of fourteen hospitals was formed with two groups. One group had seven teaching hospitals and the other group was seven non-teaching hospitals.

Patient satisfaction data was collected by a questionnaire at discharge as well as admission and discharge volume records. The Likert scale surveys were distributed by mail to each participating facility. The study included admission, discharge and demographic data of participating facilities over a five year period. The responses were converted into scores from 1 - 100. Descriptive statistics were used to obtain mean, median, mode, and standard deviation. Correlations between patient satisfaction scores
Statistical analysis of data showed an average mean of 82.5 with 100 being the highest on patient satisfaction scores and 19,111 hospital admissions over a five year period. The study demonstrated a significant but negative correlation between patient satisfaction and admission volume. Additionally, further study revealed that differences exist between mean scores for patient satisfaction in teaching and non-teaching hospitals (Ganey et al., 2009). These findings suggested that as patient satisfaction decreases, hospital admissions increased; and in teaching hospitals, the patient satisfaction scores were statistically lower than non-teaching hospitals. A positive correlation between patient satisfaction and admissions volume overall was also demonstrated (Ganey et al., 2009).

Explanations for the negative correlation between teaching and non teaching hospitals include the multiple staff in more complex teaching hospitals as well as the size of the institutions. The study suggested that teaching hospitals often create multiple contact points for the patient compared to less complex non-teaching hospitals. This study has implications and relevant to nurse staffing patterns and admission volume as well as further study of the variances between teaching and non-teaching hospitals.

Measuring patient satisfaction requires attention as perceptions of satisfaction can be highly subjective. For this reason, variables used to determine levels of satisfaction continue to be developed. Studies have been conducted to identify clinical satisfaction variables from the perception of chronically ill patients. This study conducted by Blixen

Osteoarthritis (OA) is a major cause of disability in older adults and knee OA is more likely to result in disability than OA of any other joint in the body. The effect of OA on function, quality of life and cost of care is substantial. Patients with OA are more likely than unaffected patients to be limited in the amount and type of major activities they can perform, have more restricted bed days than normal, and more likely to report disability. Older people with OA experience much suffering, depression and diminished quality of life over an extended period of time. This cohort due to the clinical presentation of chronic illness is representative of patient perceptions of clinical nursing care.

The purpose of this study was to describe the quality of life of older adults with OA and varying levels of depression and social support as a basis for targeting nursing interventions specifically for this population. The study was conducted by trained nurse interviewers in both outpatient clinics and the homes of the participants. The interviewers were specially trained to cover the content of the instruments but also to understand the special needs of this population under stress, living with a chronic illness, pain and may be depressed. The study is relevant as it identifies additional patient outcome variables.

A total of 50 patients with documented diagnosis of OA were selected who met the broad criteria of being age 60 or older, community dwelling and who were routinely monitored in the outpatient arthritis clinics of two large urban acute care hospitals. The sample was not selected based on gender, socioeconomic status or co-morbidities; this was intended to represent a broad heterogeneous sampling of patients with OA.
Data was collected using a cross-sectional survey design obtained in a 45 minute face to face interview. Patients were asked to rate 6 measurements of severity and quality of life:

(a) Severity of OA by rating the difficulty in performing specific activities of daily living, levels and characteristics of pain. Level of depression by rating frequency of specific symptoms over the past week.

(b) Formal social support determined by a checklist of supportive services used by the patient in the previous month.

(c) Informal support and satisfaction determined by identifying members of the patients personal support system and then rating their satisfaction with their support network.

(d) Quality of life determined by using the Quality of Life survey (QOLS) which measures 5 specific domains of quality of life.

(e) Demographic and other data such as age, gender, comorbid conditions and medication use (Blixen & Kipps, 1999).

Basic descriptive analysis was used, such as frequencies, means and standard deviations. Chi-square was used to determine statistical significances between arthritis severity and quality of life, and arthritis severity and depression. Overall, there were varying levels of depression among the participants in this study; there is evidence in this population a strong relationship between physical health impairment and depression. Poor health has been found to be the most significant indicator of depression; additionally, older adults with chronic diseases and depression are at greater risk for institutionalization and death than healthy counterparts.
In this study, however, despite the existence of depression and chronic medical conditions, the subject’s satisfaction with quality of life was very high. The subjects had few formal social support systems, relying instead on a large network of family and friends or informal support systems. The researchers related the subjects’ satisfaction with quality of life to the informal social support network. As a moderating variable, informal social support systems appear to decrease the effects of stress on quality of life and contribute to overall well-being.

Perceived positive quality of life has been shown to encourage self-management behavior in elderly chronically ill patients, such as exercise, nutrition, seeking meaningful interpersonal relationships, practicing stress reduction techniques, and health information. These conclusions are significant to nursing practice as they support the inclusion of chronic disease self-management, patient education, and social support interventions. This study demonstrates the development of specific patient outcome variables which previous studies (Aiken et al., 2007). The study showed sensitive to nursing care, such as patient satisfaction, symptom management, level of pain management, and functional status. The concept quality of life is discussed in this study and presented as the concept of patient’s perceived quality of life. This study also demonstrates the significance of subjective patient perception as a quality indicator.

**Background Variables**

Background variables are defined as patient, nurse and organizational/institutional factors which have an indirect impact on the relationship between nurse staffing and patient outcomes, but not unique to either category. These variables must be considered in order to demonstrate accurate and meaningful conclusions. The review of literature
related to background variables focuses on new and emerging concerns in the healthcare profession and represent variables not previously included in the model study by Aiken et al. (2007).

An essential component of nursing practice involves teamwork and interpersonal skills. The current phenomenon of interaction between new “generation X” nurses and the “baby boomer” generations has not been thoroughly examined due to the historical timeline. Important concerns related to generational affiliation and the effect on nurse staffing and patient care outcomes. Management of generation X falls primarily on the baby boomers creating communication issues and clashing value systems. An important aspect of determining the staffing mix and staffing needs involves demographics and interpersonal skills. It is challenging for healthcare leadership to understand and creating harmony between these two generations.

Since the terms “generation X” and “baby boomer” do not have clear definitions, one research question was to define the meaning, age groups and calendar years that would include the two generations. The second research question involves defining specific characteristics of the generations that would relate to the work environment, interpersonal relationships, and its effect on quality of care. The study framework is not explicitly defined and involves a population of 423 registered nurses in the workplace (Cordeniz, 2002).

Data was collected by using a comprehensive questionnaire to determine stress levels and a follow up focus group. The questionnaire variables were stress, strain and coping. Survey questions were related to situations requiring interpersonal skills and the ability to work as a team. The objective of the survey was to determine the similarities
and difference in the stress levels of each generation. Focus groups were held with the nurses who participated in the surveys to discuss issues and perceptions of the survey. The focus groups consisted of 10 sessions and 14 nurses out of the 431 (n=44). The focus group sample was purposive and selected to represent the 2 generations.

The findings showed that the generation x nurses experienced more stress, but did not have a negative perception of Baby Boomers. Adversely, the baby boomers showed less stress and 40% had negative perceptions of generation x. The goal of this study included application of the findings to nurse retention strategies, including both generations and assisting nurse managers in staff development (Cordeniz, 2002).

The study revealed many findings that were previously unmeasured and unfamiliar. The relevance of the study was appropriate for the current timeline of nursing and workforce changes in the profession. For the nurse leader who understands the importance of staff nurse retention, this knowledge is of value. The initial study warrants further investigation to expand the current nursing knowledge base related to an intergenerational workplace.

Factors which directly contribute to nurse staffing include burnout and stress. In a study conducted by Poncet, Toullie, Papazian, Kentish-Barnes, Timsit, Pochard, Chevret, Schlemmer, and Azoulay (2007), nurse burnout syndrome (BOS) was examined. Using BOS in critical care nurses as the study variable, the researchers identified the fact that although nurse burnout syndrome (BOS) is widely known, it had not been validated through a formal analysis. The purpose of the study was to identify determinants and precursors of BOS and areas where action can be taken to improve nurse staffing.
The research questions were: “Can precursors to BOS be identified; “Can nurse staffing be improved by modifying the identified precursors to BOS?” The focus of these questions is on improving nurse staffing by identifying and managing stress and the correlation with quality of patient care. The study was conducted in 165 hospitals throughout France. The study settings were the intensive care units (ICU) of each hospital for a total of 286 ICU’s (Poncet, et al., 2007).

The sample included a population of 2525 ICU registered nursing staff members. The nursing staff was composed of both clinical and administrative RNs, as well as non-licensed nursing staff. The questionnaires incorporated demographics, nurse’s subjective perceptions of stress and the Maslach Burnout Inventory (MBI). The MBI is a reliable evidence based scale used to assess BOS as it manifests in staff nurses and health care service workers. The MBI was tested and showed reliability in a previous study (Poncet, et al., 2007). Out of the 2525 nursing staff members, 2392 (82%) returned questionnaires. The questionnaires were distributed to the head nurse of each ICU in the study to distribute to the staff. Out of the 2392, nursing staff members 80% were licensed nurses, 15% nursing assistants, and 5% head nurses (Poncet, et al., 2007).

Data was collected using a 3 page questionnaire which was distributed to staff nurses and head nurses in 165 ICUs. The questionnaire itself was composed of multiple parts which included the MBI instrument. Incorporating a tested and proven measurement tool allowed research to further break down the determinants into classifications: emotional exhaustion, depersonalization, and personal accomplishment variables which have been proven to be core determinants of BOS (Poncet et al., 2007).
Statistical analysis of the study was completed on data obtained from several components including the survey. Findings revealed that there is little difference in detriments for BOS among staff nurses, non-licensed staff, and nurse managers. It was determined, severe BOS was identified in 38% of the sample. The findings also demonstrated that the types of hospital with the highest RN BOS were teaching hospitals.

Among the highest determinants of nursing staff BOS were: ability to manage own schedule, take time off as requested, participation in performance improvement workgroups, and the quality of interpersonal working relationships. Other factors with significant ratings were number of nightshifts works and number of hours per day. The most significant indicators were decreased quality of care, absenteeism, high turnover rate, and poor communication with co-workers and families (Poncet et al., 2007).

Considering the high proportion of the sample demonstrating severe BOS (32.2%) and depressive symptoms this study opens the opportunities for stress and burnout management strategies. Quantitative analysis has demonstrated the primary determinants of BOS and can now be studied further and researched in regard to preventive strategies (Poncet et al., 2007).

Among variables which can be influenced by preventive strategies include providing nursing staff wider control of work schedule; in addition to involving nursing staff in decision making, quality improvement initiatives, workplace culture, and preventive strategies. All of which can be addressed by administration and senior leadership.
Summary

Review of literature on nurse staffing and patient outcomes reveals multiple studies in both acute care and long term care settings, suggesting that these areas are labor intensive for professional nursing staff (RN). This body of knowledge requires further analysis to draw conclusions regarding the complexity and type of nursing care provided. The prevalence of consistent nurse staffing issues across multiple care settings establishes the need for reliable methods of identifying, monitoring and measuring the related variables.

The literature chosen for review focuses on the concepts, methods of outcome measurement, nurse to patient ratio, and patient satisfaction and clinical outcome indicators. The review of literature shows that there is an ongoing need for specific outcome measures unique to the profession of nursing. Since the practices of nursing as well as the healthcare environment are perpetually changing, so must the methods for determining clinical quality and patient satisfaction. Of particular interest is the study by Aiken et al., (2007), using the Delphi panel tool and model for this research proposal. This study addresses three concepts by analyzing the collective opinions of international experts in clinical practice, nursing education, and administration using evidence based survey process. This study provides the framework for future identification of variables and outcome measures related to nursing care.

The purpose of this study was to establish a set of outcome measure variables to provide a baseline tool for further studies and nursing resource management. Thirty-two experts participated in the Delphi panel and reached consensus that nursing hours per patient day and the proportion of RN staff to other nursing staff, such as licensed
practical nurses and unlicensed assistive personnel, were key indicators of quality of care. In replicating this study, the variables are nurse staffing, patient outcomes, and background variables, further categorized as quality indicators in Chapter three (Tables 1-4), and the research questions: What are the relationships between nursing human resource issues and healthcare quality based on both empirical findings and expert opinion; Of these relationships which are the most significant quality indicators of nursing care?

In addition to methods of outcome measure, RN productivity indicators were reviewed to address the ongoing nursing shortage crisis. Use of unlicensed assistive personnel (Castle, Hawes, Kash, & Naufal, 2006) and increased emphasis on patient education (Ehnfors, Ehrenberg, & Florin 2005) were primary concepts in these studies. The current studies regarding use of unlicensed assistive personnel and less professional nurses showed a negative impact on quality of care when used as replacements, but an increase in productivity overall when used as support for patient care requirements. The study on patient education showed that nurses perceived patients desired more involvement in decision making than did the patients; and there is a need for more focus on patient education for health promotion.

In summary, these studies support the conclusion that the unique skills and specialized education of professional nurses is a major factor in determining the quality of care received by patients in a variety of hospital and extended care settings. These summaries support the conclusion an increased number of RN staff is a valid indicator of positive patient outcome. The importance of reliable methods of patient outcome measurement is a significant aspect of determining quality of care. This body of
knowledge is perpetual, ongoing as the healthcare industry evolves, and does not remain static.

Additional evidence based variables related to nurse staffing will be added to the existing list of variables from the Aiken et al.’s, (2007) study. These variables are intergenerational workplace and nurse burn-out syndrome. The study will contribute additional patient outcome variables based on the Joint Commission ORYX core measures. These variables are timely blood collection in patients with suspected pneumonia, timely EKG in patients with chest pain, and timely administration of pre-operative antibiotics. These variables are evidence based and quality indicators. ORYX core measures integrate outcomes and other performance measurement data designed to be criteria in the accreditation process. These variables are included to show correlation between accreditation requirements and nurse staffing as practical application of the study findings (The Joint Commission, 2009). An additional background variable, RN turnover rate, will also be included. RN turnover rate is dependent on both organizational and market factors and not exclusive to nurse staffing or patient outcome variables. The study will also generate additional peer reviewed variables from the perspective of an expert panel.
Chapter III

Methodology

Introduction

There is considerable debate among researchers on methods of determining key variables used to measure patient outcomes. There is ongoing evidence that more specific outcome measures unique to the nursing profession are needed as nursing practice evolves. Common methods of analyzing patient outcomes such as mortality is too broad and not nursing specific (Aiken et al., 2007). The purpose of this study is to assess the key variables used in research and practice regarding nurse staffing and patient care outcomes based on review of literature and from the perspective of an expert panel.

The purpose of the Delphi study is to evaluate existing variables related to nurse staffing and patient outcomes and to identify correlations between variables. The findings are intended to assist nursing leaders in making informed decisions regarding staffing as well as contribute additional expert perspectives for future research. The framework is based on the concepts; nursing human resource utilization, patient satisfaction and clinical outcomes. The conceptual definitions are factors directly related to nurse staffing patterns, mix, clinical outcomes, and nursing care from the perception of the patient. The relational statement, RN staffing patterns have a direct impact on the quality of patient care, is qualitative and derived from the research tool the Delphi survey relying on expert opinion. This study is a partial continuation of the study conducted by Aiken et al., (2007) and utilizes some of the same variables identified. The findings of this study will
contribute to current research and existing knowledge base related to utilization of nurse staff resources and measuring patient satisfaction. The purpose of this chapter is to describe the population, sample, methodology, and procedures to be utilized.

Research Question

The research question are:

1. What are the relationships between nursing human resource issues and healthcare quality based on both empirical findings and expert opinion?
2. Of these relationships, which are the most significant quality indicators of nursing care?

Population, Sample, and Setting

The sample population will be 75 registered nurses, who are employed in multiple care settings; private and government long term care facilities hospitals and educational institutions in the State of Florida. The specific inclusion criteria are registered nurses with a minimum of a master’s degree in nursing, who specialize in at least one of the following areas of practice: clinical, education, administration, quality management, and staff development. Status as a subject matter expert will be determined by a combination of self or peer nomination and direct selection based on the sampling criteria.

Protection of Human Rights

The study proposal will be submitted to the Ball State University Institutional Review Board for review. Participation is voluntary and responses are confidential. Personal information regarding study participants will not be available to other participants. The submitted information will be anonymous. There are no negative consequences due to participation or non-participation. Participants will respond to
survey questions on an internet site, which uses software that records responses and does not identify individual participants. Invitations to participate in the study will occur by letter or email. Consent to participate in the study will be acquired electronically through the web-based software. Completion of a login registration form will provide the panelist with an opportunity to agree or disagree, agreement confirms consent to be a panelist in the study. Study participants will be informed that they will receive a report of the study findings.

Procedures

Potential study participants will receive information about the study by letter and email. Potential participants are invited to participate if they meet the inclusion criteria. Once the sample has reached at least 30 (n=30) the participants will be screened based on the inclusion criteria. The resulting sample will be provided with the hyperlink to the survey website and full instructions regarding the procedures of the Delphi study.

A three round Delphi panel will be conducted using evidence based variables from literature review. Using a nominal Likert scale (1-4), the panelists will be asked to rate, nurse staffing, patient outcome and background variables based on importance and recommend new variables based on expert opinions, and published literature. New variables will be requested in round one only. In round two the participants will be provided with the scores of round one. The new variables from round one will be added to the survey and variables which did not score three or greater will be eliminated. Round three will repeat the methods of round two, but new variables will not be introduced.
Research Design

The research design is descriptive correlation, grounded theory using the classic Delphi panel technique. As descriptive correlation this study examines relationships that exist in specific situations, namely nurse staffing and patient outcomes. Grounded theory methodology is useful in discovering what problems may exist in a specific setting or in processes. Grounded theory research also establishes evidence based and intuitive relationships between variables (Burns & Grove, 2005).

Instrumentation, Reliability, and Validity

Instrumentation

Use of the Delphi technique allows for the reformulation and redevelopment of the research tool, the survey, until a theory can be developed related to the relationship between nurse staffing patterns and patient outcomes. The classic Delphi approach will be used to forecast and identify consensus among experts regarding the relationships between variables. The use of the Delphi technique can be beneficial as it allows for a group to collaborate without personal interaction in using this method opinions cannot be altered by the persuasive influence of others. This study uses a classic Delphi approach which is intended to reach consensus regarding the current methods of evaluating nurse staffing and patient outcomes. (Burns & Grove, 2005)

Panelists are asked to rate the importance of nurse staffing variables to overall staffing patterns. Panelists are asked to rate the variables in two dimensions. Their perception of how much the variables are related to the number of nursing staff to total patient volume and to what extent the outcomes were related to nursing patterns and skill
mix as shown in Table 1, using the nominal Likert scale: 1. Very unlikely 2. Unlikely, and 3. Likely 4. Very likely (Aiken et al., 2007).

Panelists are then asked to rate the importance of patient outcome variable, as shown in Table 2, in establishing a relationship with nurse staffing. Patient outcomes are categorized as: medical/surgical complications, infection control, patient safety, utilization, and comfort, subjective and objective outcomes using the Likert scale: 1. Not useful 2. Somewhat useful 3. Useful, and 4. Very useful (Aiken et al., 2007).

Finally the panelists are asked to rate the importance of the background variables as they are related to nurse staff and patient outcomes. Background variables are categorized as; patient characteristics, nurse characteristics, organizational systems and characteristics as shown in table 3. Background variables are rated using the Likert scale: 1. Not important 2. Somewhat important 3. Important, and 5. Very important (Aiken et al., 2007).
Table 1.

*Nurse Staffing Variables*

<table>
<thead>
<tr>
<th>Nursing Staff to Patient Volume</th>
<th>Staffing Plan - Type of Staff</th>
<th>Skill Mix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursing hours per patient day</td>
<td>Total nursing staff</td>
<td>Proportion of licensed nursing staff</td>
</tr>
<tr>
<td>Nurse to patient ratio</td>
<td>Total licensed nursing staff</td>
<td>Proportion of RN’s to total nursing staff</td>
</tr>
<tr>
<td>FTE nursing staff employed overall</td>
<td>All RN staff</td>
<td>Proportion of RN’s to all licensed nursing staff</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Proportion of RN’s with bachelor’s degrees</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Proportion of RN’s with graduate degrees</td>
</tr>
</tbody>
</table>

Note: “nursing staff” is composed of the total number of RNs, LPNs and NAs, “licensed staff” is composed of RNs, LPNs
<table>
<thead>
<tr>
<th>Patient Outcome Variables</th>
<th>Medical Surgical Complications</th>
<th>Infection Control</th>
<th>Patient Safety</th>
<th>Utilization Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper gastro-intestinal bleeding</td>
<td>Nosocomial infections</td>
<td>Falls</td>
<td>Length of stay (LOS)-hospital</td>
<td></td>
</tr>
<tr>
<td>DVT/PE</td>
<td>CLA bloodstream infections</td>
<td>Falls with injury</td>
<td>LOS-intensive care</td>
<td></td>
</tr>
<tr>
<td>CNS complications</td>
<td>Urinary tract infection (UTI)</td>
<td>Medication errors</td>
<td>Readmission within 10 days of discharge</td>
<td></td>
</tr>
<tr>
<td>Renal Failure</td>
<td>Urinary catheter associated UTI</td>
<td>Unplanned extubation</td>
<td>Readmission within 30 days of discharge</td>
<td></td>
</tr>
<tr>
<td>Metabolic delirium</td>
<td>Hospital acquired pneumonia</td>
<td>Reintubation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shock</td>
<td>MRSA colonization</td>
<td>Prevalence of restraints</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiac arrest</td>
<td>Ventilator associated pneumonia</td>
<td>Suicidal behavior</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiac failure</td>
<td>Hospital acquired sepsis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aspiration pneumonia</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulmonary failure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-op complications</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2 - Continued.

Patient Outcome Variables
<table>
<thead>
<tr>
<th>Comfort, Wellness</th>
<th>Subjectively measured outcomes</th>
<th>Objectively measured outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptom management</td>
<td>Patient satisfaction</td>
<td>Mortality rate (overall)</td>
</tr>
<tr>
<td>Level of pain/pain管理</td>
<td>Nurse perceived quality of care</td>
<td>Failure to rescue</td>
</tr>
<tr>
<td>Functional status</td>
<td></td>
<td>Timely blood culture collection in patients with suspected pneumonia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Timely antibiotic administration to patients with pneumonia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Timely EKG to patients presenting with chest pain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Timely administration of prophylactic pre-operative antibiotics</td>
</tr>
</tbody>
</table>
Table 3.

**Background Variables**

<table>
<thead>
<tr>
<th>Patient characteristics</th>
<th>Nurse characteristics</th>
<th>Organization Systems</th>
<th>Organization Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Education level</td>
<td>Institution type</td>
<td>Organizational culture</td>
</tr>
<tr>
<td>Gender</td>
<td>Experience in the profession</td>
<td>Hospital size</td>
<td>Professionalism of patient care environment</td>
</tr>
<tr>
<td>Type of illness</td>
<td>Experience in a specific hospital</td>
<td>Geographic location</td>
<td>Management staff advocacy</td>
</tr>
<tr>
<td>Severity of illness</td>
<td>Experience in a specialized area</td>
<td>Size of nursing unit</td>
<td>Nursing leadership</td>
</tr>
<tr>
<td>Co-morbidities</td>
<td>Employment status</td>
<td>Use of currently available technology</td>
<td>Nurse-physician relationships</td>
</tr>
<tr>
<td>Admission type</td>
<td>Age/generation</td>
<td>Magnet designation</td>
<td>Nurse autonomy</td>
</tr>
<tr>
<td>Admission source</td>
<td>Prevalence of burn out syndrome</td>
<td>Accreditation Status</td>
<td>Opportunities for professional development</td>
</tr>
</tbody>
</table>

- Use of staffing models
- Overtime utilization
- RN turnover
- Nursing staff absenteeism
- Nursing intensity/acuity
- Non-nursing tasks performed by RNs
- Tasks left undone
Reliability

Reliability using the Delphi technique is difficult to establish due to the subjective nature of responses. The exact marginal homogeneity test will be calculated with available statistical software to establish reliability between each round of responses (Aiken et al., 2007). This test is a generalization of the McNemar Test used to determine the changes in categorical dichotomous variables. In this study, the dichotomy is consensus or non-consensus within the categories.

Validity

Validity is determined by the level of consensus of the panel of experts. Following each round of the Delphi survey descriptive statistics will be used to determine the mean, median, and standard deviation of the ranking of variables. Consensus on variables is confirmed by a mean of ≥ 3.0 for each variable or those which are ranked three or four by the panelists. A consensus of ≥ 85% will be considered as a correlation.

Measure of Data Analysis

Descriptive statistics will be used to measure mean, mode and standard deviation of scores. Consensus will be determined by variables which have been rated three or four or a mean score of ≥ 3.0, by at least 85% of the panelists. The classic Delphi technique will consist of three rounds using a nominal Likert scale survey. The panelists will receive the results of the previous rounds as basic statistical data, mean, median mode, and standard deviation. Round one will consist of 11 nurse staffing variables, 44 patient outcome variables and 34 background variables. The variables are then placed in the
categories; nurse staffing, patient outcomes and background influences. Correlation will be determined by consensus as a mean score of ≥ 3.0 on each current and expert recommended variable. In round two variables not considered important as determined by a mean score ≤ 2 by the panelists will be eliminated and any recommended new variables will be added. In round three the methodology of round two will be repeated and considered conclusive.

Summary

Specific outcome measures unique to the nursing profession are needed as nursing practice evolves. It is essential that administrators and nurse leaders have reliable peer reviewed quality indicators to measure nursing care. The purpose of this descriptive correlation study using the classic Delphi approach is to identify evidence based nurse staffing and patient outcome variables and show consensus by a panel of experts. The study will attempt to generate new variables from the perspective of subject experts.

An anticipated sample of 30 nurse subject experts will participate as panelists and complete a three round survey. The classic Delphi technique will consist of three rounds using a nominal Likert scale survey. The panelists will receive the results of the previous rounds as basic statistical data, mean, median mode and standard deviation.
<table>
<thead>
<tr>
<th>Source</th>
<th>Problem – Research Question</th>
<th>Purpose - Research Question</th>
<th>Framework or Concepts</th>
<th>Sample</th>
<th>Design</th>
<th>Instruments</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aiken, Clarke, Sermeus, Van den Heed, &amp; Vleugals (2007)</td>
<td>Current variables used in research on assessing the relationship between nurse staffing and patient outcomes not adequate to determine quality of nursing care and patient satisfaction</td>
<td>To assess the key variables used in research on nurse staffing and patient outcomes from the perspective of an international panel and develop new quality of care measures.</td>
<td>Nursing Theory</td>
<td>Nurses surveyed by Delphi group (n=29) International panel of nursing experts in management, administration and, research and staff development (n=39)</td>
<td>Grounded Theory Delphi Panel</td>
<td>Delphi survey</td>
<td>Nursing hours per patient day received the highest consensus score as an indicator of quality of care, and the proportion of RNs to total staff received the highest score as indicator of adequate staffing</td>
</tr>
<tr>
<td>Author(s)</td>
<td>Study Description</td>
<td>Methods</td>
<td>Results and Findings</td>
<td></td>
<td></td>
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<tr>
<td>Barr, McSweeney, Potter &amp; Sledge (2003)</td>
<td>The relationship between number of RN staff, patient satisfaction, and quality care has not been adequately clarified.</td>
<td>To determine baseline patient outcome measures in relation to RN staffing and to provide a tool for nursing staff resource management.</td>
<td>Patient outcomes: Patient satisfaction, Professional nurse staffing, Quality of care. Inpatient care units (N=32)</td>
<td>Prospective Correlation</td>
<td>Patient falls index, Medication errors, Inpatient self reports, Post-discharge satisfaction surveys, Staffing plans. A negative correlation between percentage of RN hours and patients’ perception of pain and a positive correlation between RN hours and patient satisfaction.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study Reference</td>
<td>Research Question</td>
<td>Sample Size/Description</td>
<td>Methodology</td>
<td>Findings</td>
<td></td>
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<tr>
<td>-------------------------------------------------------------------------------</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gruber-Baldinini, Konrad, Park, Sloane, Stearns, &amp; Zimmerman (2007)</td>
<td>Little is known about staffing patterns and the outcomes of staffing and patient care in nursing homes</td>
<td>n=1894 residents from 1894 nursing homes</td>
<td>Descriptive Longitudinal</td>
<td>Care hours per resident decreased with facility size and increased with the prevalence of dementia. Current staffing levels for the outcomes analyzed meet most resident's needs. Increased use of licensed nurse may be related to a decrease in acute care admissions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Castle, Hawes, &amp; Naufal (2006)</td>
<td>High nurse staff turnover rates have a negative impact on quality of patient care, continuity of care, staff retention and overall patient outcome</td>
<td>To compare the effects of RN staff turnover rates in nursing homes on assistive personnel recruitment and retention and patient outcome</td>
<td>Professional Nurse Staffing Nurse retention Patient outcome</td>
<td>(n=1014) data collected from nursing homes in Texas</td>
<td>Cross sectional</td>
<td>Medicaid cost report Ordinary least squares (OLS) 2 SLS for hypothesis testing</td>
<td>Staff turnover as a predictor of staffing levels revealed mixed results depending on staff type, RN and CNA turnover rates were a predictor and LVN turnover rates were not. These results confirm the importance of focusing not only on nursing staff recruitment but also retention which directly reflect quality of care.</td>
</tr>
<tr>
<td>Graham, Hegman, Henderson, Meador, Pillemer, &amp; Schultz (2008)</td>
<td>High nursing staff turnover rates are becoming increasingly problematic as more people enter nursing homes. There is a need to develop employee retention programs and models to address this ever growing problem.</td>
<td>To reduce employee turnover rates by creating a retention specialist position in nursing homes.</td>
<td>Nurse staffing Nurse retention Organizational theory Human resources</td>
<td>n=30 nursing homes in New York</td>
<td>randomized, controlled intervention</td>
<td>comparative measurement of turnover rates over 1 year Staff interviews</td>
<td>Treatment facilities experienced significant decline in nurse staff turnover rates in the test facilities compared to the control facilities. This study provides evidence that the retention specialist model is effective.</td>
</tr>
<tr>
<td>Greene, Harrington, &amp; Hongsoo, (2009)</td>
<td>Quality of care in America’s nursing home is a significant concern. With a consensus on the importance of RN staff as related to quality of care. Based on this assumption this studies attempts to demonstrate that minimum RN staffing levels would improve staff retention and improve quality of care</td>
<td>To demonstrate that minimum RN staffing levels would improve staff retention and improve quality of care. To demonstrate a correlation between nurse skill mix and quality of care</td>
<td>Nurse skill mix Nurse staffing quality of care</td>
<td>n=411 California nursing homes</td>
<td>retrospective panel data study</td>
<td>number of regulatory violations California State licensing and certification data</td>
<td>The RN to total nursing staff ratio was negatively associated with total deficiencies. As the ratio of RN's to LPN's increased regulatory deficiencies decreased</td>
</tr>
<tr>
<td>Ehnfors, Ehrenberg, &amp; Florin (2005)</td>
<td>There is currently limited knowledge about patient preferences for participation in care and how nurses perceive the patients preferences</td>
<td>To compare the similarities and differences between Registered Nurse and patients perceptions of the patients desire for decision making in nursing care and to compare the patients experience with their preference.</td>
<td>Quality of Care Patient Outcomes Patient education Clinical Practice</td>
<td>Nurse: Patient dyads (n=80) meeting specific inclusion criteria</td>
<td>Comparative Descriptive</td>
<td>Control Preference Scale Patient experience questionnaire</td>
<td>A majority of Registered Nurses perceived that their patients had a higher degree of participation in decision making about their care than did the patients</td>
</tr>
<tr>
<td>Ganey, Messina, Scotti &amp; Zipp (2009)</td>
<td>Healthcare executives have a need to better understand the relationship between patient satisfaction and admission volumes and to understand the differences between teaching and non-teaching hospitals.</td>
<td>To examine the relationship between patient satisfaction and admission volume. What is the relationship between patient satisfaction and inpatient admissions in acute care hospitals?</td>
<td>Patient outcomes inpatient satisfaction and inpatient admissions (n=14)</td>
<td>(n=14) Teaching and non-teaching hospitals</td>
<td>Correlational Comparative Analysis</td>
<td>Staff Survey inpatient satisfaction questionnaire</td>
<td>Nominal Likert scale, Spearman rank-order correlation, Mann-Whitney U test</td>
</tr>
</tbody>
</table>
Table 4 - continued

| Blixen, & Kippes (1999) | Patients with Osteoarthritis are more likely than are unaffected patients to be limited in the amount and type of major activities they can perform, have more restricted bed days than normal and are more likely to report disability. Older people with OA experience much suffering, depression and diminished quality of life over an extended period of time. | To describe the quality of life of older adults with OA and varying levels of depression and social support as a basis for targeting nursing interventions and identify patient outcome variables related to quality of life and subjective comfort. | Patient satisfaction Quality of Life | n=50 adults aged 60 or older with a diagnosis of osteoarthritis | Qualitative Descriptive | cross-sectional survey descriptive analysis Chi square | Perceived positive quality of life has been shown to encourage self-management behavior in elderly chronically ill patients and to seek health information. These conclusions are significant to nursing practice as they support the inclusion of chronic disease self management, patient education and social support interventions |
Table 4 - continued

| Cordenez (2002) | Two thirds of the nurse workforce is now over 40. Up to 60% of these nurses are preparing for retirement. As the new generation of nurses, known as generation X enters the workforce with a different set of values and perceptions than the baby Boomer generation. Management must identify ways of merging these two groups | To identify characteristics, work ethics, values and perception of generation X nurses and compare these to those of the retiring Baby Boomer generation. To identify methods for creating harmony among these two generations | Nurse staffing Nurse retention Staff Development Workplace culture Organizational theory | (n=256) RNs in acute care settings | Qualitative | Self assessment Focus groups | It is crucial two generations work harmoniously as both groups have valuable skills and attributes. The Baby Boomer generation of more experienced nurses can provide new nurses with guidance and the benefits of experience. While the generation X nurses bring independence and fresh knowledge. Significant managerial challenge to blend these two groups to maintain cohesion |
Table 4 - continued

| Poncé, Toullie, Papazian, Kentish-Barnes, Timsit, Pochard, Chevret, Schlemmer, & Azoulay (2007). | Little is known about burnout syndrome in healthcare professionals and how it may affect quality of care. Intensive care units are highly stressful work environments for nurses. | To identify determinants of burnout syndrome in critical care nurses the impact on quality of patient care. | Nurse retention Professional Nurse staffing Quality of care (n=2392) nursing staff members working in 165 intensive care units throughout France | Cross Sectional Questionnaire survey Chi Square test Fischer exact test Multivariate analysis SAS 9.1 software | The most prevalent impact of nurse burnout syndrome was decreased quality of patient care, high turnover and absentee rates and poor communication with families. |
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The Joint Commission (2009). *Performance measure initiatives; ongoing activities.*

Retrieved November 9, 2009, from

http://www.jointcommission.org/NR/exeres/5A8BFA1C-B844-4A9A-86B2-F16DBE0E20C7.htm