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The effects of an educational intervention on nurse -physician collaboration and compliance rates with quality indicators for cardiac patients in critical care settings

Sara L. Clutter
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The Effects of an Educational Intervention on Nurse-Physician Collaboration and
Compliance Rates with Quality Indicators for Cardiac Patients in Critical Care Settings

Sara L. Clutter

Dissertation submitted to the School of Nursing at West Virginia University in partial
fulfillment of the requirements for the degree of

Doctor of Philosophy in Nursing

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ABSTRACT

The Effects of an Educational Intervention on Nurse-Physician Collaboration and Compliance Rates with Quality Indicators for Cardiac Patients in Critical Care Settings

Sara L. Clutter

Purpose: The purposes of this study were to investigate the effects of an educational intervention on knowledge, nurse-perceived nurse-physician collaboration, and compliance with quality indicators and to assess the relationship between collaboration and compliance. This study also investigated the difference in collaboration and knowledge between and within nurses from intensive care (ICU) and intermediate care (IMCU) settings.

Research Questions: Six research questions guided this study. The questions compared knowledge, collaboration scores, and compliance with quality indicators between and within intermediate and intensive care unit nurses before and after an educational intervention. Questions also addressed the relationship between collaboration scores and compliance with discharge quality indicators.

Background: Nurses have knowledge of individual patients' acceptance of and reaction to health concerns. Nurses are also the central point of coordination for the interdisciplinary care team. Collaboration between nurses and physicians provides a process for discipline-specific information to be shared and team members to work together for better patient outcomes. Episodes of less than optimal collaboration between healthcare professionals lead to miscommunication and medical errors.

Method: A pretest-posttest design was used with a convenience sample of 88 registered nurses from critical care settings. Knowledge was measured by a criterion-based, investigator-developed test. Collaboration was measured using the Collaboration and Satisfaction about Care Decisions instrument. Compliance with quality indicators was determined by comparing the number of met versus expected indicators. Major limitations were a non-representative convenience sample, use of self-report instruments, assumption of complete and accurate documentation, and low power for some analyses.

Conclusions: The educational intervention was effective in improving knowledge about collaboration as well as expected quality outcomes for cardiac patients among critical care nurses. The increased knowledge resulted in improved perceptions of collaboration by IMCU nurses but not ICU nurses. This increased knowledge did not result in improved compliance with discharge quality indicators in either group of nurses. There was no relationship identified between collaboration and compliance rates.

Significance: Improvements in perceived collaboration between healthcare providers may lead to fewer episodes of miscommunication and medical errors. Participation in an educational intervention can improve perceptions of collaboration. This information may be beneficial to nurse educators as they individualize education for critical care nurses.

Dedication

To my husband Dave ... my best friend, my confidante, my life partner: no one knows better than you what we have sacrificed to achieve this goal. I could not have accomplished this without your love, support, hours of sacrifice, hugs, and words of encouragement! ... All that I am, all that I have accomplished, and all that I have contributed to the science of nursing ... is because of your love, encouragement, and support. It is with pride and passion that I dedicate this dissertation, and my love, to you – forever.

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CHAPTER 1

Introduction

Collaboration between nurses and physicians has been recognized in the United States as a benchmark of excellence and an important contributor to safe and effective healthcare and satisfying work environments ("100K lives campaign," 2006; Havens & Johnston, 2004; Institute of Medicine, 2001; Laschinger & Leiter, 2006; Mark, Saylor, & Smith, 1996; Zangaro & Soeken, 2007). In recent years, the healthcare environment, in which nurse-physician collaboration (NPC) occurs, has undergone multiple changes. These changes include a shortage of nurses, frequent use of temporary staff, higher acuity patients, and chaotic contexts for communication between professional caregivers (DeFrances & Hall, 2007; Page, 2004; Zangaro & Soeken). In addition, the ever-changing milieu of the healthcare environment is seemingly always 'busy' and replete with opportunities for distractions. Synergistically, these factors create an environment that may be neither supportive of nor conducive to effective NPC as reflected by nurses' reports of feeling overwhelmed by 'tasks' (Budge, Carryer, & Wood, 2003; Laschinger & Leiter). These feelings may result in nurses neglecting to devote time and energy to the vital process of NPC.

Collaboration is particularly important in the acute care arena where patient acuity is higher, distractions are more frequent, patient flow is faster, lengths of stay are shorter, and the number of interdisciplinary caregivers is greater (Center for Health Workforce Studies School of Public Health University at Albany, 2001; Needleman, 2001). This research study was designed to examine the effect of an educational intervention on knowledge, nurse-perceived NPC, and compliance with quality indicators. In addition,

the investigator evaluated relationships between collaboration and both demographic characteristics of registered nurses (RNs) and compliance with quality indicators.

Background of the Study

The process of collaboration includes working together, cooperating, and sharing information, data, thoughts, and knowledge (Baggs & Schmitt, 1988). Inherently, the process of collaboration involves at least two parties. In the acute care setting, the need for collaboration between nurses and physicians is omnipresent.

Representing one half of the primary professional caregiving dyad, RNs complete ongoing assessments and provide interactions, psychosocial supportive measures, and teaching to patients and family members. In critical care settings, these interactions frequently include the provision of physical care measures and assistance with activities of daily living. Involvement in these elements of nursing care results in the RN spending a large portion of time in close contact with the patient and his/her family members. Thus, the RN has knowledge of information about the individual patient's acceptance of and response to treatment that may otherwise be unknown to other members of the healthcare team. In addition, the RN provides one central point of coordination for the interdisciplinary care team. In this role, the RN communicates with all other interdisciplinary members regarding the plan of care and progress toward patient goals.

Physicians are responsible for diagnosing and monitoring the patient's progress with all instituted therapies and for issuing prescriptions for medication or other treatments to promote efficient recovery or peaceful death. Contributing medical knowledge and expertise, physicians represent the other half of the primary professional caregiving dyad. For the patient to receive the best care based on the most comprehensive

information and knowledge, exchanges of unique information between nurses and physicians must occur. Collaboration provides the vehicle through which this exchange occurs. Collaboration between nurses and physicians has the potential to affect the quality of care received by the patient and, ultimately, the outcomes the patient experiences. Conversely, lack of collaboration has the potential to influence patient outcomes negatively.

Without collaboration, the fundamental elements of shared information, cooperation, and working together are lost, and discipline-specific inputs to patient care deteriorate into unilateral contributions. These unilateral contributions may be made independent of, even contradictory to, vital elements of information held by the other half of the primary professional caregiving dyad. Because the physician is the primary professional caregiver responsible for writing prescriptions for medications and other treatments, physician input is consistently evident. Input from the nurse, however, is not as evident and cannot be assumed.

Nurses are involved with many care processes that contribute to health outcomes that the “patient can feel or experience” (Harris et al., 2001, p. 24). Nursing contributions toward the attainment of these health outcomes is not always obvious or measurable. Intermediate health outcomes are ones that are apparent before longer term health outcomes are recognized. These intermediate health outcomes are often more objective and thus, more measurable (Harris et al.). For these reasons, intermediate health outcomes are frequently used to measure efficacy of healthcare processes, such as collaboration. When intermediate outcomes contribute to desired longer term health outcomes, are supported by science, and are accepted by the professional community,

they may be treated as measurable outcomes of care processes. One type of intermediate health outcome is compliance with quality indicators. For cardiac patients, the association between the intermediate outcome of compliance with discharge quality indicators has been supported by “the strongest clinical evidence” (Bonow et al., 2005, p. 1855).

Discharge quality indicators for acute myocardial infarction (AMI) and heart failure (HF) have been identified by the Center for Medicare and Medicaid Services (CMS). Patients for whom these quality indicators have been met experience improved health outcomes and fewer complications (Antman et al., 2004; Bonow et al., 2005; Center for Medicare and Medicaid Services, 2006; Smith et al., 2006). Registered nurses are involved with the discharge process, thus have the opportunity, through collaboration, to influence care decisions related to compliance with these indicators. No researchers have investigated the relationship between NPC and compliance with quality indicators.

The current healthcare environment presents challenges to evaluating the contribution of nurses to the collaborative exchange. Per-diem and agency nurses may be unfamiliar with members of the house medical staff and reluctant to engage in collaborative exchanges. Higher patient acuity, shorter lengths of stay, and chaotic contexts for communication have resulted in a more chaotic environment that may negatively affect both the available time and receptivity of potential nurse collaborators.

The nursing shortage (United States Department of Health and Human Services Health Resources and Services Administration, 2002) has presented yet another challenge: the influx of less experienced nurses working in more complex, high acuity clinical environments. Anecdotally, nurse educators report a notable increase in the percentage of new graduates being hired into critical care environments (J. Mackorjak

and K. Schnell, personal communication, April 30, 2008). These inexperienced nurses may lack the knowledge, skill, or confidence to collaborate effectively about patient care issues and concerns.

The challenges of the healthcare environment combined with the influx of inexperienced RNs present both clinical and research opportunities to investigate methods to influence the process and outcomes of collaboration positively. Scientific inquiry into the effect of improved knowledge, skill, and confidence on the core process of collaboration is needed.

One method to improve knowledge and skills of practicing RNs is professional continuing education (Avillion, 2001). This method has been used to provide new or updated information and to review or reinforce previously known information that has been forgotten (Bastable, 2008). Nurse-physician collaboration is one such topic that may need to either be taught or reinforced with today's professional RNs. Although included in undergraduate curricula (*The essentials of baccalaureate education for professional nursing practice*, 1998; National League for Nursing Accrediting Commission, 2005), the application of this content may have fallen from the priority attention of some RNs. Another consideration is that in 2004, 67% of RNs reported their initial nursing education as diploma or associate degree level (United States Department of Health and Human Services Health Resources and Services Administration, 2006, p. A2). Inherent in the curricula of these entry-level programs is a focus on technical skills rather than professional interactions, including collaboration with physicians (National League for Nursing Accrediting Commission, 2005). This further reinforces the need for continuing education on the fundamental elements of collaboration for today's RN workforce.

Education for RNs in the clinical setting must be constructed with attention to the context of the learning environment. Considering the current nursing shortage, staffing patterns on busy clinical units may not support the release of multiple staff nurses to attend traditional classroom education sessions simultaneously. Furthermore, many nurses consistently work off-shift tours of duty resulting in a convenience issue for the scheduling of “live” education events.

Self-paced education is an alternative method for providing on-going education to professional RNs. Based on the principles of adult learning, self-paced education packets afford the learner control of the learning session (Bastable, 2008). In addition, the use of self-paced packets allows flexibility in providing education for RNs working various schedules. For acute care nurses, self-paced education packets can be completed anytime during the day and need not be completed all at the same sitting, thus making them a viable alternative to live classroom sessions. To be most effective, educational efforts must be linked to patient outcomes.

The Problem Statement

Nurse administrators strive to support processes that have the potential to influence both patient and professional outcomes positively. Many research studies support the influence of collaboration between nurses and physicians on such outcomes (Baggs, 2007; Boyle & Kochinda, 2004; Dechario-Marino, Jordan-Marsh, Traiger, & Saulo, 2001; Institute of Medicine, 2001). There is evidence linking collaboration to the outcomes of mortality, readmission, length of stay, and cost of care (Baggs et al., 1999; Curley, McEachern, & Speroff, 1998; Knaus, Draper, Wagner, & Zimmerman, 1986; Lassen, Fosbinder, Minton, & Robins, 1997). Although these are important health

outcomes, most direct care nurses may not be aware of them. Nurses' awareness of the relationship between NPC and the intermediate outcome of compliance with quality indicators may provide a stimulus for improving collaboration. The research problem is that no studies exist to indicate whether or not improvements in nurses' perceptions of collaboration with physicians affect compliance with discharge quality indicators. Additionally, although described in theoretical context, no researchers have investigated whether the process of collaboration between nurses and physicians can be influenced positively by an educational intervention aimed at RNs in acute care settings. Documentation of a positive effect is vital to securing future financial resources to establish and maintain education programs to improve the quantity and quality of NPC among acute care RNs. Empiric support of this effect would provide a unique contribution to nursing science.

Conceptual Framework

The conceptual framework for this study, depicted in Figure 1, is provided by the Baggs and Schmitt model of NPC (Baggs & Schmitt, 1997). This model was chosen because it (a) includes a conceptual definition of NPC that is congruent with other conceptual descriptions of the concept, (b) includes knowledge as an antecedent condition for NPC, (c) addresses improved patient care as an outcome measure, and (d) has evidence supporting its appropriateness and use within acute care settings. This model was developed via grounded theory approach from data provided by 10 intensive care unit nurses and 10 medical resident physicians. Thematic analysis of the data resulted in the identification of three sequential phases of the process of NPC: antecedent conditions, core process, and outcomes (Baggs & Schmitt, 1997).

Figure 1 – Schematic Model of Baggs & Schmitt Model of Nurse-Physician Collaboration

(Baggs & Schmitt, 1997, p. 74)

Antecedent Conditions

Antecedent conditions comprise the first phase and are described as those elements that must be present for effective NPC to occur. When analyzing the qualitative data contributing to the development of this theory, the researchers noted that “most of the participant discussions concerned antecedent conditions needed before collaboration could occur” (Baggs & Schmitt, 1997, p. 73). Two main themes emerged within the antecedent conditions: being available and being receptive.

Being available was described in terms of being in the same place, having time to devote to the process of collaboration, and having the knowledge to contribute something of value. Described in detail, knowledge appeared to be a major contributor to the antecedent condition of being available (Baggs & Schmitt, p. 75). Two main dimensions of knowledge were evident: (1) professional knowledge specific to the participant’s professional role as nurse or physician and (2) personal knowledge related to the roles, responsibilities, and constraints of the other provider type (nurse or physician). In general, nurses with more experience were viewed as more competent and more knowledgeable than those with little experience. Nurses who were knowledgeable about the resident physician’s other responsibilities and time commitments were also viewed as more knowledgeable.

Being receptive included four dimensions: interest in both collaboration and care of the patient, discussion, respect, and trust. Participants described interest, respect, and trust using conventional terms. Discussion was described in detail as a “conversation with give and take where all parties contributed” (Baggs & Schmitt, 1997, p. 75). Critical

elements of discussion were reported as active listening, openness, and questioning (Baggs & Schmitt).

Core Process: Collaboration

According to the conceptual framework, if the antecedent conditions are present, then the core process of working together can occur. Figure 1 depicts the schematic model of NPC, where the core process clearly follows the antecedent conditions (Baggs & Schmitt, 1997, p. 74). The core process of working together includes three dimensions: working as a team, focusing on the patient, and sharing both information and communication (Baggs & Schmitt). This process was described as working together toward the common goal of the “patient’s wellbeing” (Baggs & Schmitt, p. 77). Descriptors included teamwork, discussing problems, and sharing information. Sharing was further described as “communication, sharing information, listening to each other, and responding” (Baggs & Schmitt, p. 77).

Outcomes

Improving patient care, feeling better in the job, and controlling costs (Baggs & Schmitt, 1997, p. 74) were identified as outcomes of effective collaboration. Both nurses and physicians agreed that improvements in patient care were a primary outcome of effective collaboration. These improvements were described in terms of rapid actions for changes in patient care needs through maximizing information needed to plan comprehensive care for the patient. Both nurses and physicians indicated that each brought different information about the patient to the collaborative exchange and that both sets of information were necessary to plan the best care for each individual patient.

Secondary outcomes of collaboration were identified as job satisfaction, learning, and cost containment (Baggs & Schmitt, 1997).

The Baggs and Schmitt model of NPC was derived from a qualitative study in a medical intensive care unit. It has been used as the conceptual framework for subsequent studies in that and other intensive care settings (ICU; Baggs et al., 1997; Baggs et al., 1999; Dechario-Marino et al., 2001). This model had not been tested in lower acuity care settings, such as intermediate care units (IMCU). In addition, no studies were found in which the Baggs and Schmitt model of NPC was used to test the relationship between an identified antecedent cause, such as knowledge, and the core process of working together. Therefore, the purpose of this study was to investigate the effect of an educational intervention on nurse-physician collaboration and compliance rates with quality indicators.

Definition of Terms

Table 1 presents conceptual and operational definitions of major concepts within the research questions. This table also identifies the empiric indicator for each term.

Table 1. Definitions and Empiric Indicators of Research Terms

Term	Theoretical definition	Operational definition	Indicator
Personal demographic characteristics	Characteristics that describe the personal and background attributes of each participating registered nurse which may influence the critical attributes of nurse-physician collaboration	Investigator developed self-report questionnaire including: age, gender, race, unit, work status, position, year of graduation from initial nursing education, type of initial nursing education, highest nursing degree completed, current enrollment in an educational program, current certification status, whether or not the registered nurse participated in the pilot project for this dissertation study, and number of years for each of the following descriptors: as an RN, at the study institution, assigned to any critical care unit, and assigned to the study unit.	Individual responses to demographic questionnaire
Knowledge	Reproducing information about the incidence and prevalence of cardiac disease in the United States, best practices for the achievement of optimal outcomes in cardiac patients, evidence base supporting diagnosis-specific discharge quality indicators for acute myocardial infarction and heart failure, and definition and critical attributes of nurse-physician collaboration.	Investigator created knowledge test.	Knowledge score

Term	Theoretical definition	Operational definition	Indicator
Nurse-physician collaboration	“Nurses and physicians cooperatively working together, sharing responsibility for problem-solving and decision-making, to formulate and carry out plans for patient care” (Baggs & Schmitt, 1988, p. 145).	Self-reported Collaboration and Satisfaction about Care Decisions (CSACD) instrument (Baggs, 1992).	Average of total collaboration scale scores by each nurse
Compliance with diagnosis-specific quality indicators	Compliance with discharge indicators for acute myocardial infarction and heart failure, as described by the Center for Medicare and Medicaid Services (Bonow et al., 2005; Center for Medicare and Medicaid Services, 2006; The Joint Commission on Accreditation of Healthcare Organizations, 2002)	The actual number of criteria documented was recorded as the numerator and the expected number of criteria to be documented as the denominator. The numerator was then divided by the denominator, multiplied by 100, and rounded to the nearest whole number.	Compliance score

Research Questions

The following research questions guided this study:

1. Is there a difference between knowledge scores (about collaboration and discharge quality indicators for cardiac patients) before and after the intervention?
2. Is there a difference between collaboration scores collected before and after the intervention?
3. Is there a difference between compliance rates with diagnosis-specific discharge quality indicators for cardiac patients before and after the intervention?
4. Is there a relationship between nurse-perceived nurse-physician collaboration and compliance rates with diagnosis-specific discharge quality indicators for cardiac patients (beta blockers, angiotensin converting enzyme inhibitors, aspirin, assessment of left ventricular systolic function, smoking cessation counseling, discharge instructions)?
5. Is there a difference in knowledge scores (about collaboration and discharge quality indicators for cardiac patients) between nurses from intermediate care units and nurses from the intensive care units before or after an educational intervention?
6. Is there a difference in collaboration scores between nurses from intermediate care units and nurses from the intensive care units before or after an educational intervention?

Model of Investigation

The model of investigation used to guide this study is depicted in Figure 2. This study investigated the effect of the antecedent condition of being available on the core process of collaboration. Additionally, this study investigated the relationship between the core process of collaboration and the outcome of improving patient care through maximizing information (Baggs & Schmitt, 1997). The mid-level conceptualization of the antecedent condition of being available was a knowledge score. The mid-level conceptualization of the core process of working together was nurse perceived NPC. Compliance with diagnosis-specific discharge quality indicators represented the mid-level conceptualization of the outcome of improving patient care.

Figure 2. Model of Investigation

Overview of Methodology

This study had a one-group pretest-posttest design. Nurse participants on four critical care units were obtained via convenience sample. Two study units were intermediate care settings and two were intensive care settings. Nurses on all study units were asked to provide collaboration data on consecutive discharge episodes. Demographic and collaboration data were collected via self-reported questionnaires. The investigator collected outcome data about compliance with quality indicators via retrospective audit of associated medical records.

Participants completed one demographic questionnaire at baseline and three knowledge tests: at baseline, after exposure to the collaboration questionnaire, and after exposure to the educational intervention. Participants also completed collaboration questionnaires before and after the educational intervention. The investigator collected compliance data from discharge charts corresponding to collaboration events both before and after the intervention.

A between-group comparison of baseline knowledge about collaboration and discharge quality indicators for cardiac patients was made for IMCU and ICU nurses. Knowledge scores, collaboration scores, and compliance scores, obtained before and after the completion of an educational intervention, were compared both within and between groups.

The Professional Significance of the Study

Nurse administrators are charged with achieving optimal outcomes while maintaining professional environments that support evidence-based practices. Collaboration between nurses and physicians has the potential to facilitate that goal. The

quality indicators described by CMS provide one set of goals for this achievement (Jha, Li, Orav, & Epstein, 2005). These indicators address high incidence, high cost illnesses, and thus represent opportunities for major improvements to patient care while significantly reducing financial burdens for society. Disorders of the cardiovascular system underlie two of these illnesses.

Cardiovascular disorders affected 80.7 million adults in the United States (Rosamond et al., 2008, p. e31) and was the single most common diagnosis in 2005, accounting for 4.2 million acute care discharges (DeFrances & Hall, 2007, p. 3). Cardiovascular disorders accounted for one death every 37 seconds (Rosamond et al., p. e32) and cost the United States \$448.5 billion in 2008 (Rosamond et al., p. e36). Given the current struggling economy, inadequate healthcare reimbursements, and escalating numbers of underinsured and self-pay patients, hospital administrators are searching for ways to improve outcomes of these common diagnoses. The findings of this study could contribute to a better understanding of NPC and may improve collaboration through an educational intervention. If improved collaboration is subsequently related to better compliance with discharge quality indicators for cardiac patients, both human and financial benefits would result. Better compliance with quality indicators would translate into better outcomes of care for AMI and HF patients (Antman et al., 2004; Bonow et al., 2005; Smith et al., 2006). Because patients who experience better outcomes of care experience fewer sequelae of illnesses (Fonarow et al., 2007), cost of care would be lower. In addition, improved compliance with quality indicators has the potential to result in higher reimbursement for acute care settings (Anthem links hospital reimbursement, 2003).

Assumptions

This research study was structured upon the following assumptions:

- (1) Nurses and physicians strive to collaborate.
- (2) The quality and effectiveness of collaboration between nurses and physicians varies with each separate encounter.
- (3) Collaboration between nurses and physicians occurs along a continuum ranging from no collaboration to complete collaboration.
- (4) Perceived collaboration between nurses and physicians is measurable.
- (5) Intermediate care units have a lower patient: nurse ratio than medical-surgical units.
- (6) Intensive care units have a lower patient: nurse ratio than intermediate care units.
- (7) Medical records document information regarding compliance with discharge quality indicators.

Limitations

Limitations of this study were the use of a convenience sample from one community hospital, a sample that may not be representative of nationally reported characteristics of RNs, the use of self-report surveys, the use of an investigator-developed educational intervention, and the assumption of completeness and accuracy of documentation. Another limitation was hospital-wide use of pre-existing, pre-printed discharge instruction sheets that “prompt” RNs about the discharge quality indicators established by CMS. In addition, nurses may have unintentionally contributed to sampling bias in that those who perceived themselves to be poor collaborators, or those inattentive to compliance with discharge quality indicators, may have chosen not to

participate. Finally, the educational intervention used in this study was designed by the principal investigator and not previously tested for validity or efficacy.

Organization of the Dissertation

Chapter 1 presents a case for the importance of collaboration between nurses and physicians as a means of decreasing the numbers of adverse patient outcomes. The process of collaboration is defined, described, and supported by qualitative research. The theoretical framework, definitions, assumptions, and research questions used to guide this research study are described. Facts about the human and financial burden of cardiovascular disorders are presented to justify the use of these diagnoses as ones upon which to focus attempts to improve outcomes. Finally, the possibility of collaboration being influenced by an educational intervention is presented. Each of these elements are then defined and described as part of the research study that investigates the effect of an educational intervention on collaboration and compliance rates with discharge quality indicators for cardiac patients in critical care settings.

Chapter 2 presents both a review and critical appraisal of literature related to collaboration. Strengths, limitations, and gaps in this body of evidence are described. Literature addressing the significance of cardiovascular disorders, evidence base of the quality indicators of cardiac care, and current state of compliance with these indicators are summarized with gaps identified. Finally, evidence supporting self-paced learning activities as an acceptable continuing education strategy for professional adults is presented.

Chapter 3 presents a detailed description of the methodology and procedures used to conduct the described study. Detailed descriptions of variables and samples are

presented. This chapter also identifies and describes the statistical methods used to analyze the data.

Chapter 4 presents descriptive data about the sample as well as statistical answers to each research question. Tables display aggregate data, comparisons with previous data, correlations, and results of other statistical analyses.

Chapter 5 presents discussion about findings related to each research question. The fit of the current study with the theoretical framework is presented. Strengths and limitations as well as clinical implications of the current study are discussed. Finally, opportunities for future research are suggested.

CHAPTER 2

Introduction

This chapter contains a chronologic review of evidence about collaboration between nurses and physicians followed by a critical appraisal of that evidence. Next, evidence justifying cardiovascular disorders as current clinical health disparities in the United States is presented. This includes supporting evidence for diagnosis-specific discharge quality indicators and of sub-optimal compliance with those indicators. Finally, evidence of the educational efficacy of self-paced learning is presented.

Background Literature

Collaboration is a concept frequently cited in studies from multiple professional disciplines. Dating back to the 1980s, anecdotal and research articles assert the strong influence of nurse-physician collaboration (NPC) on patient outcomes (Baggs, 2007; Baggs, Ryan, Phelps, Richeson, & Johnson, 1992; Baggs et al., 1999; Institute of Medicine, 2001; Knaus et al., 1986; Mitchell, Armstrong, Simpson, & Lentz, 1989; Nakanishi, Koyama, Ito, Kurita, & Higuchi, 2006). Unfortunately, these studies have been constructed with varying conceptual and operational definitions of NPC, making comparison of results difficult. The research problem is the assumption of a relationship between NPC and positive patient outcomes without documentation of aggregate empiric data to support such claims.

Chronologic Review of Historical Literature on Nurse-Physician Collaboration

Early studies investigating the relationship between NPC and patient outcomes focused on structures and processes believed to support collaborative environments (Knaus et al., 1986; Mitchell et al., 1989). Despite the availability of the psychometrically

supported Collaborative Practice Scale (CPS; Weiss, 1985), these early studies failed to directly measure collaboration between nurses and physicians. Instead, early researchers evaluated contextual aspects of the clinical environment presumed to support collaboration.

Knaus, Draper, Wagner, and Zimmerman (1986) evaluated data from 5,030 intensive care unit (ICU) patients in 13 different urban-based acute care hospitals. These researchers concluded that several process and structure aspects of care influenced expected versus actual mortality rates. One care process included in this study was the interaction and coordination of ICU staff. While not citing or measuring the concept of collaboration, the researchers included a discussion of the attributes of independent responsibility, communication between nurses and physicians, respect, coordination of care, and being available. Each of these was subsequently identified as vital attributes of collaboration (Baggs & Schmitt, 1988; Baggs et al., 1997; Henneman, 1995; Henneman, Lee, & Cohen, 1995; Mark et al., 1996). After controlling for severity of illness, patient outcomes in only two of the 13 ICUs were statistically different. The mortality rate of one of these two units was significantly lower ($p < .01$) than expected (Knaus et al., p. 415). That unit reported more independence among nurses as well as better communication and mutual respect between nurses and physicians. The second unit, with higher than expected mortality rates ($p < .01$), reported fewer measures and supports for collaborative interactions (Knaus et al., p. 415). Evidence from the other 11 ICUs did not support any differences in expected mortality rates despite varying measures and supports of the critical attributes of collaboration.

Also focusing on organizational supports for collaboration, Mitchell and colleagues (1989) used a subscale of the Charns Organizational Diagnosis Survey to measure NPC. This research yielded data that supported the presence of a high level of nurse-perceived NPC (mean of 6.1, +/- 0.63 SD on a possible 7.0 scale; Mitchell et al., 1989, p. 230) and a lower than expected mortality rate ($\chi^2 [1, N=192] = 7.905, p < .005$; p. 232). Although the authors concluded that patient outcomes were associated with collaboration, the results of this study should be interpreted cautiously. Variations in organizational, unit, and clinical nursing processes presented a threat to the internal validity of this study. These processes included decentralized nursing administration, management support within 30 minutes for all patient problems, on-unit pharmacy and respiratory therapy support, and high levels of autonomy reported by the registered nurse (RN) staff relative to patient care and decisions about unit function. The study unit also had policy, procedure, and standard of care supports congruent with recommendations from the American Association of Critical Care Nurses (AACN). Although multiple variables were measured, statistical analyses did not attempt to assess the effect of any one variable while controlling for the effect of others. Additionally, 70% of RN participants reported advanced specialty certification (Mitchell et al., p. 229). This expertise may have influenced both attitudes toward and conduct of collaboration among providers. Finally, a low internal consistency reliability ($\alpha = .53$) was noted for the collaboration subscale used in this study (Mitchell et al., p. 235). Despite the limitation of not specifically measuring the key research concept of collaboration, these researchers concluded a relationship between NPC and positive patient outcomes that has been presumed ever since.

Baggs and colleagues (1992) used a descriptive design to study the relationship between NPC and patient outcomes in one university-affiliated medical ICU.

Collaboration was measured using the newly constructed Decision About Transfer (DAT) tool. Collaboration data were collected from 56 RNs and 31 medical resident physicians involved in 286 consecutive transfer episodes. Mean collaboration scores were calculated for each provider. Negative patient outcomes were defined as readmission to the medical ICU or death during the index hospitalization. Results supported the hypothesis that higher levels of NPC were predictive of lower risk of negative patient outcomes ($\beta = -.22$, $t = -2.31$, $p = .020$; Baggs et al., 1992, p. 21). Mechanisms to control for severity of illness and the use of a homogeneous patient care atmosphere supported internal validity of this study. Unfortunately, weak correlation of the DAT with the previously established CPS ($r = .27$, $p < .005$; Baggs et al., 1992, p. 20) provided an instrumentation threat to the internal validity of this study.

Using a randomized controlled trial, Jitapunkul et al. (1995) evaluated the effect of “multidisciplinary team approach and a strengthened physician-nurse collaboration” (p. 618) on mortality and length of stay of 943 female medical inpatients in a university-affiliated hospital in Thailand. The intervention included regular ward rounds during which multidisciplinary concerns were discussed. Although clinically significant reductions in length of stay were evident in patients less than 74 years of age (p. 619), statistical significance was only achieved in the 60 – 74 year old group ($p = .01$; p. 621). Using a scale of 0 – 10, the multidisciplinary team group rated the benefits of strengthened physician-nurse collaboration as 7.6 ($SD = 1.9$; p. 621). This same team rated the benefits of a multidisciplinary team approach as 8.5 ($SD = 1.5$; p. 621).

Researchers concluded that the strengthened physician-nurse collaboration and multidisciplinary team approach contributed to shorter lengths of stay for the study participants. A design limitation of this study was the use of female only medical wards. A procedural limitation was the lack of definition or measurement of two central concepts: multidisciplinary team approach and physician-nurse collaboration. Finally, researchers used separate house officer coverage between control and intervention wards. Although this strategy provided for control of contamination of provider interactions, it may have contributed to bias of the treatments delivered, amount of collaboration available, and patient outcomes.

A continuous quality improvement strategy was used to investigate the difference in outcomes for 1,102 patients admitted to a university-affiliated acute tertiary care hospital (Curley et al., 1998). Patient and provider outcomes for multiple disciplines were compared between the interdisciplinary rounds (experimental) group and the traditional rounds (control) group. Collaboration was measured using an investigator-created survey designed to measure interdisciplinary communication and teamwork. Although no psychometric analyses were reported for this tool, providers in the interdisciplinary rounds group reported significantly more collaboration ($p = .006$) than those in the traditional rounds group (Curley et al., p. AS10). Although the organizational outcomes of length of stay and cost of care were significantly lower in the intervention group than in the control group ($p = .006$ and $p = .002$ respectively; Curley et al., p. AS7), no difference was found in the patient outcome of mortality. Threats to this study included design limitations of a trial based on quality improvement activities and the instrumentation threat posed by the lack of psychometric analysis of the survey tool.

Replicating her previous study design, Baggs et al. re-examined the relationship between NPC and patient outcomes in three ICUs using the psychometrically sound Collaboration and Satisfaction about Care Decisions (CSACD; Baggs, 1994) instrument to measure NPC (Baggs et al., 1999). Consistent with previous research on collaboration, negative outcomes were defined as readmission to ICU or mortality. After controlling for severity of illness, a significant relationship between nurse-perceived NPC about transfer decisions and lower mortality and readmission rates was found in only one of the three study ICUs (community medical ICU, $\chi^2 [1, N = 428] = 4.3; p = .037$; Baggs et al., 1999, p. 1994). The use of consecutive transfer episodes and the documented reliability of the CSACD in all three units ($\alpha = 0.90 - 0.96$; Baggs et al., 1999, p. 1993) supported the internal validity of this study. Conversely, diversity among types of hospitals and ICUs, a small sample of RNs in some study units, and organizational differences in technology and administrative supports represented internal validity threats of selection biases in this study. Because significance was supported in only the medical ICU, generalizability of findings to other types of ICUs was not warranted.

Higgins (1999) used a prospective correlational design to investigate the relationship between NPC and patient outcomes in one medical ICU of an urban-based, university-affiliated teaching hospital. Using a convenience sample, data from 42 nurses involved in 175 transfer decisions were collected using the DAT tool. Mean collaboration scores were calculated for each nurse. Negative patient outcomes were once again defined as readmission to ICU or mortality. Patient outcomes were evaluated after only 3 days instead of 30 days as in previous research studies. Hierarchical logistic regression analyses failed to reveal any significant differences or relationships between mean

collaboration scores and patient outcomes (improvement in $\chi^2 = 0.22$, $p = .643$; Higgins, p. 1438). Despite the availability of the psychometrically sound CSACD, Higgins used the DAT. Because the DAT had a previously reported less than optimal correlation with other collaboration scales, this methodological decision represented a significant threat to the internal validity of this study.

The effect of NPC on outcomes for schizophrenic patients has also been reported (Nakanishi et al., 2006). Although this research focused on a previously unstudied patient population, it failed to define or measure collaboration in a manner that was congruent with previous research. In this study, collaboration with physicians was defined as “when nurses recognize the necessity to change medication, if they communicate with physicians, and if physicians subsequently change medication” (Nakanishi et al., p. 197). This definition accounts for only one aspect of collaboration: communication. Although data supported an improvement in social functioning among the collaborative group ($F [1,69] = 4.33$, $p < .05$; Nakanishi et al., p. 201), no significant differences were supported in patients’ acceptance of medication ($F [1,70] = 0.21$, n.s.; Nakanishi et al., p. 201). The researchers concluded that NPC “improved patient outcomes in acute psychiatric care” (Nakanishi et al., p. 196). The lack of a psychometrically tested measure of NPC represents an instrumentation limitation of this study.

Critical Appraisal of Nurse-Physician Collaboration and Patient Outcomes Evidence Search Strategy

The search strategy for this critical review was to include all potentially relevant studies. Initially undertaken in August 2007 and updated in March 2008, searches of Academic Search Premier, Business Source Elite, Cumulative Index of Nursing and

Allied Health Literature with full text, Health Source – Nursing/Academic Edition, and MEDLINE were conducted via the EBSCO host access portal. Key words/phrases included nurse-physician collaboration, physician-nurse collaboration, nurse-doctor collaboration, doctor-nurse collaboration, outcome, patient outcome, measured, reliability, instrument, collaborative practice, collaboration, nurse, physician, and patient care. No date limits were imposed. All text fields were searched using these words in a full variety of combinations. When searches returned greater than 150 hits, keywords were searched as subject terms only. In addition, the Health and Psychosocial Instruments database was searched using “outcome” and the names of each of five psychometrically supported instruments for measuring NPC. These instruments were: Collaborative Practice Scale, Collaboration and Satisfaction about Care Decisions, The Jefferson Scale of Attitudes Toward Physician-Nurse Collaboration, Nurses’ Opinion Questionnaire, and the ICU MD/RN Questionnaire (Dougherty & Larson, 2005). Reference lists of included articles were also searched for potential sources of evidence.

Given the large volume of literature on collaboration, inclusion criteria were specified to focus this critical review on studies undertaken to investigate some relationship between NPC and patient outcomes. Reviews of abstracts provided the initial screening for potential inclusion. Inclusion criteria for critical appraisal were: (1) published work with at least one research question/aim related to the relationship of NPC with a patient outcome, (2) an operational measure of NPC using one of the five psychometrically sound instruments specifically designed to measure NPC, and (3) staff nurses, not advance practice nurses, as the target population. Of the 195 articles identified

in the initial search, only two met all inclusion criteria. Details of these two articles are presented in Table 2.

Quality Appraisal

Quality of individual studies was rated according to levels of evidence identified by the United States Preventive Service Task Force (United States Preventive Services Task Force, 1989). Levels were distinguished according to the amount of control the researchers had over extraneous and confounding variables. Because only two studies met all inclusion criteria, none were discarded based on level of evidence.

Data Abstraction and Method of Synthesis

Data were abstracted using the critique worksheet developed by Rosswurm and Larrabee (1999). This instrument includes purpose, research questions, research variables, design, sample, setting, instruments, major findings, limitations, and level of evidence. A table of evidence was constructed to include study and year, sample and characteristics, setting, dependent variable, instruments and reliability, outcomes, statistics, and limitations. The table of evidence addressing patient outcomes is depicted in Table 2. This table was used during the synthesis of evidence related to demographic characteristics, variables, outcomes, and limitations of included studies. Finally, quality of the existing body of evidence was appraised according to recommendations from the U.S. [United States] Preventive Services Task Force (USPSTF; Harris et al., 2001).

Table 2. Table of Evidence - Nurse-Physician Collaboration and Patient Outcomes

Study (year)	Sample ^a	Sample characteristics RN participants (SD)				Setting	DV ^b	Instruments (reliability)	Outcomes	Limitations ^c
		Age	YA	YI	BSN+					
Baggs et al. (1992)	56 RNs and 31 RPs involved in 286 transfer decisions	31.6 years (5.2)	9.6 years (5.3)	NR	55%	Urban, UA	Negative patient outcomes (death or readmission to ICU)	CPS (NR for this study) DAT	RNs reported NPC was a significant predictor of negative outcomes (B = -0.22, t = - 2.34, p = .020) RP reported NPC was not a statistically significant predictor of patient outcome (B = .02, t = .18, p = .859)	<ul style="list-style-type: none"> • .70 power • Unsure if RN and RP define NPC the same or consider is of similar value • Single setting • Single geographic location • No α level reported for NPC
Baggs et al. (1999)	162 RNs, 97 APs, and 63 RPs involved in 1,432 transfer	35.3 years (7.3)	11.5 years (6.8)	7.7 years (5.5)	44%	3 ICUs (2 UA and 1 rural Comm non- teaching)	Negative patient outcomes (death or readmission to ICU)	CSACD (α ranged .90 - .96 among all providers at all sites)	Higher RN- reported NPC predicted positive patient outcomes in only one ICU	<ul style="list-style-type: none"> • Confounding variables: differences in organizational support, presence and availability of medical

Study (year)	Sample ^a	Sample characteristics RN participants (SD)				Setting	DV ^b	Instruments (reliability)	Outcomes	Limitations ^c
		Age	YA	YI	BSN+					
	decisions								$(\chi^2 = 4.3, p = .037)$ No association between RN-reported NPC and patient outcomes in other 2 ICUs No association between physician reported NPC and patient outcomes	coverage, different educational levels of staff among the 3 study units, institution of a collaborative care protocol during the study • Conducted in single geographic setting • Low power (.53 – .79).

Note. DV = dependent variable; RN = Registered Nurse; AP = attending physician; RP = resident physician; YA = years as RN; YI = Years in ICU; BSN+ = % educated at or above BSN level; ICU = intensive care unit; NPC = nurse-physician collaboration; UA = university-affiliated; Comm = community hospital; CPS = Collaborative Practice Scales; DAT = Decision About Transfer tool CSACD = Collaboration and Satisfaction about Care Decisions; NR = not reported

^a All samples were convenience

^b Nurse-physician collaboration was the independent variable in all studies

^c All studies were correlational in design

*Results of Critical Appraisal of Nurse-Physician Collaboration and Patient Outcomes**Evidence**Sample and Setting*

All participants in the two critically appraised research studies were RNs from ICUs, the majority from university-affiliated settings. One urban community teaching hospital was also represented. The pooled averages of RN characteristics are described as follows: 34.3 years of age with 11.0 years of experience as an RN, 93% female, 55% educated at least at the baccalaureate level (Baggs et al., 1999). Only one study reported ethnicity and years of experience in the ICU (Baggs et al., 1999). Aggregate weighted means of these data were 95% Caucasian and 7.7 years of experience in the ICU (Baggs et al., 1999, p. 1993). Pooled averages and aggregate weighted means were determined by statistical computation (Sullivan, 2007).

Correlation between Nurse-Physician Collaboration and Patient Outcomes

Both of the studies that met inclusion criteria (Baggs et al., 1992; Baggs et al., 1999) defined patient outcomes as readmission to ICU or death. One study, involving only one unit, supported an inverse relationship between NPC and negative patient outcomes ($B = -.22$, $t = -2.34$, $p = .02$; 1992, p. 21). The other study, involving three units, supported the same directional relationship in only one study unit (medical ICU: $\chi^2 = 4.3$, $p = .037$; 1999, p. 1994). Non-significant relationships were reported for the other two study units. Although physician participation was not consistent between the two studies, no statistically significant relationships were found between physician perceived NPC and patient outcomes in either study (Baggs et al., 1992; Baggs et al., 1999).

Quality of Evidence

Both studies used a convenience sample, were correlational in design, had low statistical power, and included uncontrolled confounding variables (Baggs et al., 1992; Baggs et al., 1999). Furthermore, one study had a wide variation in organizational support available for NPC (Baggs et al., 1999). Differences in management support, availability of medical coverage, and education levels of RN staff were noted.

Quality of evidence was determined according to the USPSTF hierarchy of research design (Harris et al., 2001, p. 26). This design provides for evidence to be ranked according to the strength of the research design from which it was obtained. According to this hierarchy, the available body of evidence investigating associations between NPC and patient outcomes is III. This ranking describes “opinions of respected authorities, based on clinical experience, descriptive studies, and case reports, or reports of expert committees” (Harris et al., p. 26).

Discussion of Evidence

Sample and setting. One strength of this body of evidence is the congruence of gender ($p = .29$) and educational levels ($p = .12$) of RN participants with that of the 2004 National Sample Survey of Registered Nurses (NSSRN; Bureau of Health Professions, 2004, p. para. 15 & 17). Although representative of the target population, the influence of these variables on collaborative exchanges with physicians cannot be ruled out. Given that the majority of RNs are female and many physicians are male, gender has the potential to be an intervening variable. Likewise, educational levels at or above the baccalaureate level may influence collaboration, as leadership content, including principles of collaboration, is expected in the curricula of baccalaureate and advanced

degree programs (*The essentials of baccalaureate education for professional nursing practice*, 1998; *The essentials of master's education for advanced practice nursing*, 1996). Further investigation is needed before conclusions about collaboration and these demographic characteristics can be reported.

The demographic characteristics of this body of evidence also include several limitations. First, all evidence was collected in intensive care settings. This represents a limitation because the context of ICU settings is often assumed to be more collegial between RNs and physicians than that of intermediate care (IMCU) or general medical-surgical units. This assumption is based on clinical observations that ICU settings are generally smaller in physical space than IMCU settings and that patient acuity in the ICU setting frequently demands additional interactions between RNs and physicians. The smaller physical space lends to ease of locating the other half of the professional caregiving dyad. The increased frequency of interaction represents additional opportunities for collaboration and may represent an uncontrolled confounding variable. Other limitations of this aggregate sample are that it is considerably younger ($p < .0001$) than that of the 2004 NSSRN (Bureau of Health Professions, 2004, p. para. 12) and includes an over-representation ($p < .0001$) of Caucasian nurses (Bureau of Health Professions, 2004, p. para. 17). These demographic variations may represent bias within the study sample, as generational and racial differences may influence some of the critical attributes of collaboration, such as communication, respect, trust, and power. Table 3 presents a comparison of the aggregate sample demographic data with that of the 2004 NSSRN.

Over-representation of university-affiliated hospitals is another confounding variable. University-affiliated hospitals tend to have continuous “in-house,” as well as dedicated ICU, medical coverage, which may provide more opportunities for interaction and collaboration between RNs and physicians. The under-representation of rural settings is a final gap in this body of evidence.

Table 3. Comparison of Demographic Characteristics of Aggregate Data on Nurse-Physician Collaboration with Data from 2004 National Sample Survey of Registered Nurses

Characteristic	Aggregate Data (SD) [N = 218]	National Sample Survey of Registered Nurses (SD) [N = 35,724]	z- score (p value)
Age	34.3 years (3.61)	46.8 years (8.5)	-51.02 (<.0001)
Caucasian	94.9% *	81.8%	4.37 (<.0001)
Female	93.4%	94.3%	-0.56 (.58)
BSN or above	55% **	47.2%	1.18 (.24)

**n* = 162

** *n* = 56

Critical analysis of this body of evidence reveals three key findings about aggregate samples and settings. First, the aggregate sample differs significantly from the NSSRN on age and race and thus is not representative of the United States population of registered nurses. Second, the available evidence exclusively represents ICU settings. Finally, the evidence almost exclusively represents urban hospitals, 75% of which were described as urban and university-affiliated.

Patient outcomes. Although examined in only the two included studies, the body of evidence related to patient outcomes was strengthened by consistent operational measures of NPC and patient outcomes. Similarly, iterations of the Acute Physiology and Chronic Health Evaluation (APACHE) instrument were used in both studies to control confounding variables related to individual health status of each patient. Consistency of operational definitions of patient outcomes may also be critiqued as a limitation as only two were measured: readmission to ICU and death. Because the RN providing the collaboration data did not immediately know the results of these measured outcomes, that nurse may not have subsequently realized the relationship between NPC and these patient outcomes.

Despite uniformity of design, the data from the two studies did not provide consistent results. In light of this discrepancy, the internal validity of each study must be evaluated more closely. The study that supported a relationship between NPC and patient outcomes (Baggs et al., 1992) used a single-item questionnaire to operationalize collaboration. The second study, supporting this relationship in only one of three ICUs (Baggs et al., 1999), reported evidence of multiple differences in organizational supports, educational levels of staff, and presence and availability of medical coverage between the

three study units. These factors represent uncontrolled confounding variables that may have influenced the presence or absence of collaboration. Critical analysis of the body of evidence reveals one key finding about patient outcomes: although there is evidence to suggest that some relationship may exist between NPC and patient outcomes, the available evidence is inconclusive.

Conceptual outcomes. Outcomes addressed in the existing empirical literature are congruent with the conceptual model of NPC developed by Baggs and Schmitt (1997). These researchers concluded that certain antecedent conditions are necessary before the core process of collaboration can exist, and subsequent improvements in patient, professional, and organizational outcomes will be realized. The existing body of evidence neither conclusively supports a correlation between measured NPC and patient outcomes nor includes measures of antecedent conditions such as respect, trust, time, or knowledge. In addition, the existing body of evidence does not include any data relating the core process of collaboration with the organizational outcome, of compliance with regulatory or accreditation standards. Additional research is needed to investigate this area.

Strengths of this critical appraisal are a comprehensive literature search, systematic review of evidence using a recognized data collection tool, creation and analysis of a table of evidence, and grading of evidence based on established hierarchy from the USPSTF. Limitations include potential loss of evidence from the exclusion of studies that measured the “collaborative practice environment” rather than bedside NPC.

Conclusions from Historical and Critically Appraised Evidence

Although the majority of historical studies included researcher’s discussions that NPC is associated with positive patient outcomes, evaluation of empiric data causes one

to question these conclusions. Only two of the seven historical studies presented conclusive evidence that NPC is associated with patient outcomes (Baggs et al., 1992; Mitchell et al., 1989). All other studies included mixed or discrepant evidence about this relationship (Baggs et al., 1999; Curley et al., 1998; Higgins, 1999; Knaus et al., 1986; Nakanishi et al., 2006). Heterogeneous findings may be explained by inconsistencies relative to conceptual and operational definitions of NPC, varying organizational and administrative supports for and expectations of collaboration, inadequate sample sizes, or advanced specialty certifications of some RNs. Most notably, several studies concluding a correlation between NPC and patient outcomes used measurement tools with unreported internal consistency reliability (Curley et al.; Higgins; Knaus et al.; Nakanishi et al.) and low correlation with previously supported scales to measure NPC (Baggs et al., 1992; Higgins). Finally, the CPS provides a general measure of collaboration, and the CSACD focuses on the collaboration about a specific care decision. Criterion validity between these two instruments has been presumed but not directly reported (Baggs, 1994).

Chosen outcomes and time frames for assessment provide additional explanations for the heterogeneity of research findings. To date, studied outcomes have primarily included death or readmission to ICU, however, consistent time frames were not used to assess these end outcomes (Baggs et al., 1992; Baggs et al., 1999; Higgins, 1999; Knaus et al., 1986). Finally, process variations within study units may have provided confounding influences for collaboration (Baggs et al., 1999; Curley et al., 1998; Knaus et al., 1986; Mitchell et al., 1989).

Gaps in the Evidence Addressing Nurse-Physician Collaboration

There are five gaps identified from the critically appraised evidence designed to investigate the relationship between NPC and patient outcomes. The first gap is that all evidence was obtained through correlational design studies. This methodological gap does not allow inferences of the influence of NPC on patient outcomes. Furthermore, because causal relationships cannot be inferred from correlational studies, these data do not offer strong evidence to support administrators to lobby for creation, improvement, or maintenance of skill sets and conditions that support NPC. The second gap is the under-representation of nurses from various races and ages, as the body of evidence clearly over-represents Caucasian nurses and those considerably younger than the national average. The third gap is under-representation of both rural and community hospital settings, as the body of evidence clearly over-represents urban, university-affiliated hospitals. The fourth gap is under-representation of various work settings, as the body of evidence exclusively represents nurses in the ICU work setting. These gaps prevent the generalization of findings to any other acute care, community, or primary care settings. A final gap relates to the evidence of patient outcomes. Not only is the evidence inconclusive about the relationship between NPC and patient outcomes, it represents only two outcomes: readmission to ICU and mortality. Bedside outcomes of care and quality outcomes that may influence patient care have not been studied. In addition, intermediate outcomes, such as scientifically supported indicators of care quality are not represented. These five gaps in the evidence about NPC and patient outcomes represent opportunities for further research.

*Cardiovascular Focus**Clinical Significance*

Available evidence unequivocally supports cardiovascular disorders as major contributors to morbidity, mortality, and healthcare costs in the United States (Bonow et al., 2005; Fonarow et al., 2007; Fonarow, Yancy, & Heywood, 2005; Koelling, Chen, Lubwama, L'Italien, & Eagle, 2004; Rosamond et al., 2008). The prevalence of cardiovascular disease in the United States in 2005 was 80.7 million adults (Rosamond et al., 2008, p. e31) with a projected cost of \$448.5 billion in 2008 (Rosamond et al., 2008, p. e36). Given the profound human and financial impact of cardiovascular disorders, they provide a clinically significant focus for studies aimed at improving processes supportive of patient care and positive outcomes.

Quality Indicators of Cardiac Care

One way to evaluate improvement in care and outcomes is by assessing compliance with quality indicators. Although not directly linked with patient outcomes, scientifically supported quality indicators provide a process by which patient outcomes can be measured and improved (Bonow et al., 2005; Fonarow et al., 2007; Smith et al., 2006; Yan et al., 2007). Both The American Heart Association (AHA) and the American College of Cardiology (ACC) support compliance with discharge quality indicators, as intermediate outcomes reflective of fewer complications and overall health of cardiovascular patients (Antman et al., 2004; Bonow et al.; Smith et al.). The classification of evidence supporting each discharge quality indicator has been described elsewhere (Bonow et al.; Smith et al.).

Based on evidence and recommendations of the AHA and the ACC, the Centers for Medicare and Medicaid Services (CMS) have issued discharge quality indicators for cases of acute myocardial infarction (AMI) and heart failure (HF). These quality indicators describe the best practices of care for these populations of patients (Center for Medicare and Medicaid Services, 2006; Smith et al., 2006). Compliance with these indicators is believed to be “the vehicle for more rapidly translating the strongest clinical evidence into practice” (Bonow et al., 2005, p. 1855).

Discharge quality indicators for AMI have been identified as: (1) prescription for aspirin, (2) prescription for beta blocking agent, (3) assessment of left ventricular systolic function (LVSF), (4) prescription for angiotensin converting enzyme inhibitor (ACEI) or angiotensin receptor blocker (ARB) if LVSF is $\leq 40\%$, and (5) smoking cessation counseling and education for all patients who have smoked within the past 12 months (Center for Medicare and Medicaid Services, 2006). Discharge quality indicators for HF have been identified as: (1) assessment of LVSF, (2) prescription for ACEI or ARB if LVSF is $\leq 40\%$ (Fonarow et al., 2007, p. 63), (3) smoking cessation counseling and education for all patients who have smoked within the past 12 months, and (4) provision of “written discharge instructions or educational material to include all of the following: activity level, diet, discharge medications, follow-up appointment, weight monitoring, and what to do if symptoms worsen” (Bonow et al., 2005, p. 1859; Center for Medicare and Medicaid Services, 2006). Because the presence of AMI may not be diagnosed on admission, records of patients admitted with acute coronary syndrome (ACS), chest pain (CP), and angina should also be evaluated to ascertain if an actual cardiac disorder indeed exists. In order to be proactive in preventing further acute health concerns for patients,

records of those patients discharged with acute coronary syndrome or coronary artery disease should also be evaluated for compliance with the CMS indicators.

Current State of Compliance with Quality Indicators

Investigators suggest that compliance with established quality indicators is “critical in achieving optimal patient outcomes” (Fonarow et al., 2007, p. 62).

Unfortunately, clinical compliance with established quality indicators is limited internationally (Fonarow et al., 2007; Fonarow et al., 2005; Jha et al., 2005; LaBresh et al., 2007; Nicol et al., 2008). Data from hospitals from all regions of the United States are included in the Acute Decompensated Heart Failure National Registry (ADHERE). This registry includes data on “clinical characteristics, management, and outcomes of patients hospitalized for acute decompensated HF” (Fonarow et al., 2005, p. 1469). Utilizing “data from 223 hospitals and 81,142 hospitalized episodes” (Fonarow et al., p. 1471), researchers concluded that the care of HF patients was less compliant with recommended quality indicators than expected. Aggregate data indicated compliance of eligible cases with quality indicators as follows: appropriate discharge instructions – 35%, LVSF assessment - 84%, ACEI/ARB at discharge – 72.5%, smoking cessation counseling – 48.9% (Fonarow et al., p. 1472).

Jha et al. (2005) studied compliance with CMS indicators related to AMI, HF, and pneumonia in 4,203 member hospitals of the Hospital Quality Alliance. Results of this study revealed better compliance with quality indicators for AMI than those for HF. Median compliance with AMI quality indicators was 89%; median compliance with HF indicators was 81% (Jha et al., 2005, p. 269). The researchers further concluded that variability in compliance may be related to the duration of time these indicators have

been studied or to the “importance that clinicians place” on compliance with the indicators (Jha et al., p. 272).

The Organized Program to Initiate Lifesaving Treatment in Hospitalized Patients with Heart Failure (OPTIMIZE-HF) included 48,614 patients hospitalized with HF as a primary admission or discharge diagnosis. Consistent with previous studies, overall compliance with discharge quality indicators ranged from 54% for completed discharge instructions to 87% assessment of LVSF (Fonarow et al., 2007, p. 64). Adverse clinical events of mortality and readmission were measured with a cohort of 5,791 of the participants during a window of 60 – 90 days following discharge. Significant associations were supported between either readmission or mortality and non-compliance with prescriptions for ACEI/ARB ($p < .001$) and prescription for beta blocking agents ($p < .003$; Fonarow et al., p. 65). Significant associations were supported between mortality and non-compliance with assessment of LVSF ($p = .02$), prescription for ACEI/ARB ($p < .001$), and prescription for beta blocking agents ($p < .001$; Fonarow et al., p. 65). Patients who did not suffer from any adverse clinical events were more likely to have had care that was compliant with the quality indicators of ACEI/ARB ($p < .001$), beta blocking agents ($p = .02$), and smoking cessation advice and counseling ($p = .01$; Fonarow et al., p. 65). These compliance rates indicate substantial opportunities for improvement in patient care.

Although evidence does not support the relationship between compliance with other recommended quality indicators and improvements in patient outcomes during the first 90 days after discharge, no longer-term outcomes have been studied. Results of this research indicate the need to further investigate relationships between care processes and

outcomes of care for cardiac patients (Fonarow et al., 2007). Scientific investigation into the relationship between elements of collaboration and compliance with pre-established quality indicators will add to this existing base of evidence.

An investigation into the reasons why clinical practice guidelines are not followed found that physicians lack both awareness about and familiarity with guidelines (Cabana et al., 1999). Representing the AHA, a group of researchers concluded that a lack of knowledge might contribute to sub-optimal compliance with quality indicators (LaBresh et al., 2007). Subsequently, the AHA initiated the *Get with the Guidelines* program. This large scale, interactive program included education of multidisciplinary team members from the hospital as well as suggestions for major revisions to hospital processes and systems related to cardiac care. One-year outcomes of this program revealed significant improvements in compliance with the following discharge criteria: prescription for beta-blocking agents ($p < .0001$), prescription for ACEI/ARB ($p < .0001$), and provision of smoking cessation counseling and education ($p < .0001$; LaBresh et al., p. 102). No significant impact was noted on prescription of aspirin at discharge, however the researchers noted that baseline compliance with this indicator was high at 89% (LaBresh et al., p. 101). Changes in assessment of LVSF were not measured in this study.

Further supporting the use of educational interventions to affect compliance with indicators of care quality, researchers investigated the influence of cognitive reminders for clinical pharmacists on this outcome variable. The cognitive reminders prompted pharmacist-initiated collaborative discussions with physicians. These discussions focused on the evidence base supporting recommended quality indicators as well as the continuing plan of pharmaceutical care for the patient. Based on increased awareness and

familiarity with best practices, pharmacists' discussion with physicians resulted in significantly improved prescribing of two of the four secondary prevention therapies. Prescription of ACEI ($p = .01$) and statin agents ($p = .01$) improved significantly (Bailey et al., 2007, p. 589). No improvements were noted in prescriptions for aspirin, however, baseline compliance with this therapy was quite high in both groups (96.5% in control group vs. 96.4% in intervention group; Bailey et al., p. 589). This study supported that collaborative discussions between clinical pharmacists and physicians were positively influenced by an educational intervention targeting the pharmacists. Pharmacist-physician collaborative discussions subsequently resulted in improved compliance with quality indicators. Results of this study support parallel types of interventions targeting other professional members of the healthcare team.

Summary of Evidence Addressing Compliance with Cardiac Quality Indicators

There are five key findings from the evidence addressing compliance with cardiac quality indicators. The first key finding is that discharge quality indicators, based on evidence, exist for the cardiovascular disorders of AMI and HF. A second key finding is that compliance with these defined indicators is sub-optimal. A third key finding is support for a significant association between fewer negative patient outcomes and better compliance with the defined discharge quality indicators. Fourth, knowledge deficits about the quality indicators contribute to sub-optimal compliance. Finally evidence supports educational interventions as effective mechanisms to promote compliance with best practices.

Gaps in the Evidence Addressing Compliance with Cardiac Quality Indicators

Discharge quality indicators have been supported for cardiovascular disorders; however, the effect of NPC on compliance with these indicators has yet to be scientifically investigated. Cardiovascular disorders represent a clinically significant population of discharge events for future study. Such studies would make a unique contribution to the current base of evidence for both collaboration and compliance with quality indicators. Additionally, evidence supports that knowledge deficits may be related to non-compliance with quality indicators. The addition of the antecedent condition of education to future studies would strengthen the current body of evidence. Comprising one half of the professional caregiving dyad in acute care hospitals, RNs provide a logical set of participants on which to test hypotheses involving these variables. Results of scientific inquiry with this focus will make a unique contribution to the existing body of evidence.

Knowledge

Multiple educational strategies support pedagogical theory (Conole, Dyke, Oliver, & Seale, 2004). Several strategies have been used to educate professional nurses (Avillion, 2001). According to the principles of adult learning, professional adults best accept educational events that include active involvement and focus on information that is immediately pertinent (Avillion). Faced with the previously described challenges of many acute healthcare institutions, fewer professional work hours are available for educational activities. Thus, clinical nurses may be more accepting of professional educational activities that focus on essential information, are accessible to a variety of shifts and schedules, and are presented in a concise manner.

Continuing professional education (CPE) is defined as "... activities that enhance professional practice with the effect of improving quality of health care" (Hogston, 1995, p. 586). Hogston's qualitative study assessed nurses' perceptions of the effect of CPE on quality of care. These results were thematically categorized as "new horizons," "the professional nurse," and "sanction and conviction" (Hogston, p. 588). Nurses perceived that CPE facilitated the development of new knowledge and skills, causing them to evaluate and question current practices. In addition, these nurses reported that CPE enhanced both self-esteem and self-confidence (Hogston). Finally, "the process of CPE was identified as a fundamental component of providing quality nursing care" (Hogston, p. 590).

One strategy for providing CPE is self-paced learning activities. Self-paced activities allow the learner to proceed at an individual pace, repeat sections as needed, and complete the entire educational event either all at once or in multiple sessions, as time and work assignments permit. Self-paced learning is an effective alternative to teacher-directed education strategies (Bastable, 2008). Evidence from a randomized controlled trial supported no differences in educational outcomes of knowledge, critical appraisal skills, or attitudes of medical professionals who received education about evidence-based practices by self-paced learning compared with those who learned this material in a teacher-directed format (Bradley, Oterholt, Herrin, Nordheim, & Bjorndal, 2005).

As noted in the cardiovascular section of this literature analysis, evidence-based interventions are not consistently practiced in the clinical arena despite educational events designed to improve such use (Fonarow et al., 2007; Fonarow et al., 2005; Jha et

al., 2005; LaBresh et al., 2007; Nicol et al., 2008). Multiple barriers exist that interfere with these clinical uses. Two such barriers are lack of knowledge and lack of teamwork (Cochrane et al., p. 98). Interventions aimed at reducing either or both of these barriers may favorably affect the use of evidence-based interventions thus improving the quality of care provided.

Conclusions

Substantial in neither quantity nor quality, a body of evidence examining the relationship between NPC and patient outcomes does exist. Because this evidence includes discrepant results and wide variations in the definition and measurement of the central concept, it is impossible to confidently conclude the status of this relationship. In addition, reliability data for the CSACD, a psychometrically sound instrument for measuring NPC, have only been reported among ICU nurses and resident and attending physicians (Baggs et al., 1992; Baggs & Schmitt, 1995; Baggs et al., 1997; Baggs et al., 1999). Continued research into the reliability of this scale for measuring NPC on acute care units that provide various levels of care is needed. In addition, variations in the composition of today's RN workforce provide new opportunities to re-examine potential associations between provider characteristics and perceptions of collaboration. Finally, both administrators and regulatory agencies have expressed interest in measuring and reporting various outcomes of care. This increased attention encourages the pursuit of scientific investigation into potential associations between NPC and outcomes of care other than readmission and mortality. Many bedside nurses are unaware of the association between NPC and patient outcomes due to today's flexible scheduling, weekend programs, and increased use of per-diem staff. Because outcomes that are

unknown to bedside RNs provide no reinforcement to continue or improve efforts at collaboration, investigations into more immediately known patient or intermediate outcomes are needed. Compliance with evidence-based discharge quality indicators provides one intermediate outcome that has been associated with improved patient outcomes (Antman et al., 2004; Bonow et al., 2005; Smith et al., 2006). The magnitude of the human and financial burden of cardiovascular disorders supports the clinical significance of these maladies as a focus of such scientific inquiry.

Recommendations for Nurse Administrators and Educators

Cardiovascular disorders accounted for 4.2 million discharges from acute care hospitals in 2005, the highest number of all diagnostic categories (DeFrances & Hall, 2007, p. 3). This volume of discharges has the attention of nurse managers and hospital administrators as managing aspects of care for this volume of patients is essential if hospitals are to survive financially. Compliance with quality indicators, based on best practices and supported by scientific evidence provides a process to accomplish such management, while providing improved care to patients. Scientific evidence linking an educational intervention with improved compliance with quality indicators would support the use of this education strategy for other improvement endeavors. Evidence of an association between an educational intervention and both the clinical process of collaboration and improvements in compliance with quality indicators would also provide support for nurse educators to present the topic of collaboration to RNs from other work settings.

Pay for performance incentives have also drawn the attention of nurse administrators. Third party payors are beginning to investigate the inclusion of hospitals'

compliance rates with established quality indicators into the equation of payment for services (Glickman et al., 2007). Any improvement to such compliance rates has the potential for a profound impact on hospitals' financial status. Likewise, declines in such compliance rates may be devastating to the financial balance of these hospitals. Relationships between NPC and compliance with quality indicators may offer nurse administrators new ideas with which to approach improvement processes.

Recommendations for Nurse Researchers

The Baggs and Schmitt (1997) model of NPC provides a useful conceptual framework within which to investigate research questions that remain. Gaps exist in the samples and settings within which NPC has been investigated, relationships of antecedent conditions to the core process of collaboration, and the relationship of collaboration to all classifications of outcomes. Future research needs to be conducted with diverse populations of nurses, care environments, levels of service intensity, and outcomes. In addition, studies need to be designed to investigate specific interventions that might improve the quantity and quality of collaboration.

CHAPTER 3

Methodology

The Baggs and Schmitt model of nurse-physician collaboration (NPC; 1997) provided the theoretical framework for this study. A knowledge score represented the antecedent condition of being available and nurses' perceptions of collaboration represented the core process. Compliance with diagnosis-specific discharge quality indicators represented the outcome of improving patient care. The variables addressed in the research questions were knowledge, nurse-physician collaboration, and compliance with diagnosis-specific discharge quality indicators. This chapter identifies the design of this research study and presents operational definitions of the variables. Detailed descriptions of recruitment of participants, procedures used, and statistical analyses are also included.

Research Design

This research study used a one-group pretest-posttest design. Descriptive and correlational analyses were also included. Data were collected from July to October 2008. Participants completed a knowledge test at three time points: at the beginning of the study, after baseline collaboration data were collected, and after an educational intervention. This design allowed for analysis of the influence of the collaboration survey itself on the participants' knowledge about collaboration. This study examined the effect of an educational intervention using a pretest-posttest design. Acting as their own control, participants were tested on their knowledge about attributes of collaboration, significance of cardiovascular disease, and evidence supporting the Centers for Medicare and Medicaid Services (CMS) discharge quality indicators for acute myocardial infarction

(AMI) and heart failure (HF). This study also examined the effect that the educational intervention had on compliance rates with diagnosis-specific discharge quality indicators by comparing mean rates of compliance before and after the educational intervention. Figure 3 depicts a schematic representation of the study's design.

Figure 3. Schematic Representation of Study Design

O_a/O_{b1} O_{c1} O_{d1} O_{b2} X O_{b3} O_{c2} O_{d2}

O_a = demographic survey, O_{b1} = baseline knowledge survey, O_{c1} = baseline collaboration survey, O_{d1} = baseline compliance observation, O_{b2} = time 2 knowledge survey (after exposure to collaboration survey), X = intervention, O_{b3} = posttest knowledge survey (after intervention), O_{c2} = posttest collaboration survey, O_{d2} = posttest compliance observation

Descriptive characteristics of this study included baseline knowledge about NPC, baseline total collaboration scale scores (TCSS), and baseline compliance with diagnosis-specific discharge quality indicators. Changes in knowledge about collaboration after both exposure to the collaboration survey and completion of the educational intervention were evaluated. Changes in both the TCSS and compliance with diagnosis-specific discharge quality indicators after the educational intervention were also evaluated. Correlational aspects of this study included the relationship between self-reported nurse-perceived NPC and compliance with diagnosis-specific discharge quality indicators. Personal demographic characteristics were evaluated for prediction of knowledge, collaboration, and compliance with discharge quality indicators.

Sample

Critical Care Unit Nurses

Critical care unit nurses were defined as registered nurses (RN) working in acute care units that provide a higher level of care through lower patient-to-nurse ratios than general medical-surgical units. Study units, providing such care, included the intensive care unit (ICU), cardiac care unit (CCU), and two intermediate care units (IMCU) within the study hospital. Inclusion criteria for RN participants were: RN assigned to one of the study units as (a) full or part-time permanent staff; (b) full or part-time permanent critical care float; (c) per-diem status, with completion of a minimum of 24 hours of work on the study unit during the 1 month immediately preceding the beginning of the study; and (d) involvement in the discharge care and instructions of a patient associated with an eligible discharge episode. This involvement may have been as the discharge RN or the shift RN assigned to care for the patient on the day of discharge.

Data from a previously completed pilot study indicated that the Collaboration and Satisfaction about Care Decision (CSACD) instrument ($\alpha = .98$) was both reliable and feasible for use with IMCU RNs (Clutter, 2007). Previous research also reported reliability and feasibility of the CSACD ($\alpha = .90 - .98$) with RNs in intensive care settings (Baggs, 1992; Baggs et al., 1999). Using pilot data, power analyses were computed for each statistical method planned for use. Planning for a power of .80 and the ability to detect a difference of 7 points on the collaboration scale, a two-sample independent *t*-test to evaluate research question 6 required the highest sample size. This power analysis indicated that a sample of 22 nurses was needed from both the intermediate care setting and the intensive care setting. Power analyses for the other

seven research questions indicated that a total sample of 44 will result in a power higher than .80 for the anticipated statistical methods (Clutter, 2007; Lenth, 2006). According to directors from the study units, the two intermediate care units had a total of 74 RNs available as potential participants and the two intensive care units had 47 (N. Edgell, J. Henning, T. Skinner, & C. McMahon, personal communication, April 28, 2008)

Discharge Episodes of Cardiac Patients

Discharge episodes of cardiac patients were those episodes during which the patient was discharged with a current complaint or history of any documented cardiac disorder and had (1) a provider note or cardiac enzyme result documenting chest pain, angina, acute coronary syndrome (ACS), and/or AMI resulting from cardiac origin or (2) a provider note documenting current or previous coronary artery disease (CAD), AMI, or HF. Physicians, nurse practitioners, or physician's assistants may have authored the provider notes.

This documentation could be in the admission history, admission physical, current hospitalization's laboratory or diagnostic results, or discharge summary. Additionally, an episode was considered discharged if the patient was released to: (1) residential living; (2) a less intense level of acute care; (3) a long-term, skilled care, or (4) a rehabilitation facility. Patients discharged to a higher level of care intensity were not eligible. Episodes that resulted in mortality were not eligible.

Setting

A 189-bed community, non-teaching hospital in north central West Virginia was chosen as the setting for this research study. This hospital was chosen because of its volume of cardiac patients, as well as its representation of a community acute care

hospital without university-affiliation. This was desirable to add a new setting to the scientific evidence addressing collaboration. The medical intermediate care unit (IMCU), surgical IMCU, ICU, and CCU provided the study units within this setting. These units have the capacity for 20, 31, 13, and 10 patients with a 12-month retrospective average daily census of 42 (both IMCU units were previously combined with a capacity of 54), 8, and 5 respectively (N. Edgell, J. Henning, & T. Skinner, personal communication, April 28, 2008). Approval for research was obtained from the institutional review boards (IRB) of both the investigator's academic institution and the study hospital.

Intervention

The educational intervention was a self-paced independent learning packet, *Collaboration: Your Contributions are VITAL to Better Patient Outcomes*, created by the principal investigator (PI). The intervention focused on the variables of interest and addressed the following behavioral objectives:

1. Describe the significance of cardiac disease in the United States
2. Identify discharge therapies appropriate for major cardiovascular disorders
3. Define nurse-physician collaboration
4. Describe the essential components of nurse-physician collaboration
5. Identify one thing you personally [participating RN] could do to improve collaboration between you and a physician

Information in the educational packet was obtained from current literature and appropriate nursing education textbooks. The packet required an average time investment of 35 minutes to complete. The intervention was arranged as 5 separate sections, each

addressing one objective. This arrangement was intended to support the busy schedule of clinical RNs and allow sections to be completed at separate sittings, as time permitted.

To ease visual stress and keep participants interested, the intervention included ample white space, graphics that complimented written words, and large, easy-to-read font styles. Two interactive exercises were included in the packet to encourage reflective learning and active engagement by each participant. Finally, motivational phrases were included in the longer sections to help sustain continued interest. The intervention occurred after collection of the time two knowledge score and after the collection of time one collaboration and compliance data. Time three knowledge score and time two collaboration and compliance data were collected following the intervention.

Measurement of Concepts

Personal Demographic Characteristics

Personal demographic characteristics were operationalized using a self-reported survey modeled after ones used in a previous studies pertaining to collaboration (see Appendix A) (Baggs et al., 1999; Clutter, 2007). Demographic characteristics included on this survey were age, gender, race, unit, work status, position, year of graduation from initial nursing education, type of initial nursing education, highest nursing degree completed, current enrollment in an educational program, current certification status, and whether or not the RN participated in the pilot project for this dissertation study. Data were also collected on the number of years for each of the following descriptors: as an RN, at the study institution, assigned to any critical care unit, assigned to the study unit. These characteristics provided an adequate description of the sample and were consistent with many of those reported in the previous research focusing on NPC (Baggs et al.,

1992; Baggs et al., 1999; Higgins, 1999; Mitchell et al., 1989; Nakanishi et al., 2006). In addition, comparison data about several of these characteristics were available from the National Sample Survey of Registered Nurses (NSSRN).

Knowledge

According to the theoretical framework, the antecedent condition of being available precedes the core process of collaboration, which is theorized to influence patient outcomes (quality indicators). For this study, the focus of the being available antecedent factor was knowledge. Knowledge was operationalized as the total score on a criterion-referenced test based on the content of an investigator authored, self-paced independent learning packet entitled *Collaboration: Your Contributions are VITAL to Better Patient Outcomes*. The complete independent learning packet appears in Appendix E. The knowledge test questions were constructed to address the objectives of this packet and required approximately 7 minutes to complete. Test questions addressed the first four objectives of the self-paced independent learning packet while the interactive exercises within the packet addressed the fifth objective. The test, located in Appendix B, was administered at three different times. Identical versions of the test were used at all three times and consisted of seven questions: one multiple choice, one matching, two short answer, and three multiple-multiples. Each individual piece of knowledge addressed correctly by participants on the test was awarded one point. Possible scores ranged from 0 – 26 points.

Nurse-Physician Collaboration

Nurse-physician collaboration was operationalized using the self-reported CSACD tool, located in Appendix C. This nine-item Likert-type tool uses a seven-point

agree/disagree response scale where higher numeric values represent greater amounts of collaboration and satisfaction. Of the nine items, seven measure collaboration and two measure satisfaction. Six of the seven collaboration items measure the critical attributes of planning together, communication, decision-making responsibility, cooperation, assertiveness, and coordination (Baggs, 1989, 1994). Based on previous research, these six attributes loaded on one factor during an unrotated factor analysis and accounted for “75% of the variance in collaboration” (Baggs, 1994, p. 180). The final collaboration item provides a global measure. Together, these seven items constituted the subscale of collaboration and their sum is the TCSS. The final two items measure satisfaction with the decision making process and with the actual decision made. The satisfaction items were not analyzed in this study. The CSACD required less than 3 minutes to complete. In previous research, the entire scale of this instrument had an internal consistency reliability of collaboration items ranging from .90 - .98 in both intensive and intermediate care settings (Baggs, 1994; Baggs & Schmitt, 1995; Baggs et al., 1997; Baggs et al., 1999; Clutter, 2007; Dechario-Marino et al., 2001). In addition, in pilot data with IMCU nurses the scale had .98 reliability for the collaboration subscale (Clutter, 2007; SPSS, 2004).

Diagnosis-Specific Discharge Quality Indicators

Diagnosis-specific discharge quality indicators were operationalized as the rate of compliance with discharge quality indicators appropriate for the individual discharge episode based on patient assessment data and unit of discharge. The actual number of criteria documented was recorded as the numerator and the expected number of criteria documented as the denominator. The numerator was divided by the denominator,

multiplied by 100, and rounded to the nearest whole number. The final number was recorded as the rate of compliance for each discharge episode. For example, if 4 of the 5 expected discharge criteria were met for an AMI discharge episode, the compliance rate was recorded as $([4/5]*100) = 80\%$. The number of criteria expected to be met differed based on: (1) diagnosis (AMI or HF), (2) whether or not the patient was a smoker, (3) whether or not the LVSF was below 40%, and (4) the unit of origin for the episode and its disposition upon 'discharge'. A chart review form, located in Appendix D, was used to facilitate collection of compliance data from medical records.

Procedures

Study participants were obtained through a convenience sample of nurses from each of the study units. Following one of several small group or independent sessions to introduce the study, the PI obtained informed consent from willing participants. Each participant was assigned a unique identification number to be included on all study documents for the duration of the study. Only the PI had access to information linking these unique identification numbers with participant identity. This master list was essential for the collection and matching of repeated measures of knowledge. This master list was destroyed upon completion of all data matching. All participants completed demographic questionnaires at the time informed consent was obtained. Baseline collaboration and compliance data were collected for four weeks. The educational intervention was available for participants to complete for the next four weeks. Then post-intervention collaboration and compliance data were collected for the final four weeks. No collaboration or compliance data were collected while the educational intervention was available.

Knowledge

Immediately following informed consent, all participants completed a baseline knowledge test. All eligible RNs were invited to participate. Eighty-eight RNs consented: 47 represented ICU and 41 represented IMCU. Participation rate was 89% from intensive care settings and 55% from intermediate care settings. The 88 RNs provided 100% over-sampling in an attempt to offset attrition of participants and ensure adequate power of final sample. Consented participants were asked to complete another knowledge test (time two) 6 weeks later, after collection of baseline collaboration data. The purpose of the time two knowledge test was to determine if any significant change in knowledge of collaboration occurred based on exposure to the collaboration instrument.

Following the time two knowledge test, all participants were provided a copy of the PI designed self-paced independent learning packet entitled *Collaboration: Your Contributions are VITAL to Better Patient Outcomes*. Participants had a maximum of three weeks to complete the packet. Upon completion of all activities in the self-paced, independent learning packet, participants completed a time three knowledge test. Both the packet and a knowledge test were returned to the PI. Packets were evaluated for completion of the interactive exercises to ensure content mastery of the fifth behavioral objective: identify one thing you personally could do to improve collaboration between you and a physician. Participants included their unique identification number on each knowledge test and on the self-paced independent learning packet. These documents were returned to the PI via a labeled, locked box located at the nurses' station of each study unit. Registered nurses on a leave of absence or not yet hired at the start of the study completed this educational packet upon return to work or hire.

Participants who elected not to complete the educational intervention were invited to continue to provide collaboration data and to complete the time 3 knowledge test.

These participants became an unplanned control group. Data from this set of participants were subsequently used to investigate the effect of the educational intervention on both collaboration and compliance with discharge quality indicators.

Collaboration and Satisfaction about Care Decisions

Consenting RNs from all study units were asked to complete a CSACD instrument every time they were involved in an eligible discharge episode during collaboration data collection times. These times were designated as: (1) after initial knowledge test and (2) after completing educational intervention. (Refer to Figure 4 for a timeline depicting data collection and intervention sequencing). For staff convenience, brightly colored CSACDs were attached to hospital-required discharge and transfer documents presented to RNs by clerical staff. Paid unit clerical staff, as well as volunteer clerical workers, were responsible for attaching the CSACDs to the discharge/transfer packets. The PI verified access to CSACDs on all active medical records during research rounds. Research rounds were made at least three times per week during data collection.

To allow data matching, the face sheet of each CSACD included the unique identifying number for both the RN completing the questionnaire and the associated discharge episode. Completed CSACDs were placed in a labeled locked box at the nearest nurses' station. The PI retrieved the completed CSACDs at least three times per week, matched each with the appropriate discharge episode, and collected retrospective data (pertaining to compliance with diagnosis-specific discharge quality indicators) from

the medical record of each eligible discharge episode. Collaboration data obtained for ineligible discharge episodes were discarded.

Figure 4 - Timeline depicting data collection and intervention sequencing

Diagnosis-Specific Discharge Criteria

All CMS defined discharge criteria were determined to be appropriate for AMI and HF episodes discharged to residential living, skilled care, long-term care, or a rehabilitation facility. Criteria that were not applicable to individual discharge episodes were removed from the calculation of those denominators. For example, the smoking cessation counseling criterion was eliminated from calculations of compliance for all discharge episodes that involved a patient who had not smoked during the previous 12 months.

The discharge criteria of smoking cessation counseling and provision of discharge instructions were deemed not appropriate to evaluate in episodes that were discharged from the ICU setting to a less intense level of acute care. This decision was based on the presumed 'life-threatening' nature of illnesses requiring admission to an intensive care setting. Initial recovery from such illnesses is generally accepted as an inappropriate time for discussing major life-style changes. For this sub-set of discharge episodes, the criteria of smoking cessation counseling and discharge instructions were not included as requirements. Calculations of compliance ratios for these episodes were adjusted accordingly. Compliance with diagnosis-specific discharge criteria was determined by PI conducted retrospective review of medical records. Medical records were matched with collaboration data using the account specific event number from the face sheet of each CSACD.

Analyses

Statistical Package for Social Sciences (SPSS) Graduate Pack 13.0 and 17.0 provided the statistical software used to analyze the data needed to answer the research questions:

1. Is there a difference between knowledge scores (about collaboration and discharge quality indicators for cardiac patients) before and after the intervention?
2. Is there a difference between collaboration scores collected before and after the intervention?
3. Is there a difference between compliance rates with diagnosis-specific discharge quality indicators for cardiac patients before and after the intervention?

4. Is there a relationship between nurse-perceived nurse-physician collaboration and compliance rates with diagnosis-specific discharge quality indicators for cardiac patients (beta blockers, angiotensin converting enzyme inhibitors, aspirin, assessment of left ventricular systolic function, smoking cessation counseling, discharge instructions)?
5. Is there a difference in knowledge scores (about collaboration and discharge quality indicators for cardiac patients) between nurses from intermediate care units and nurses from the intensive care units before or after an educational intervention?
6. Is there a difference in collaboration scores between nurses from intermediate care units and nurses from the intensive care units before or after an educational intervention?

Both descriptive and inferential statistics were evaluated. Data were analyzed for normality, central tendency, and variability (Munro, 2005). Measured personal demographic data were used primarily to describe the sample. These data were also evaluated to ascertain which, if any, were related to the outcome variables of knowledge, collaboration, and compliance. Personal demographic characteristics that were related to any of the outcome variables were then entered into a general linear model to determine predictors of the specific outcome. Data from research questions 1 - 3 provided mean values of continuous level data derived from participants at two points in time; thus, paired *t*-tests were used to analyze each of these questions (Munro, 2005). Research question 4 provided continuous level data for independent and dependent variables. Analysis of a relationship between these variables was accomplished using a Pearson *r* correlation (Munro). Finally, questions 5 and 6 were analyzed using a repeated measures analysis of variance (ANOVA). This analysis was used to compare differences between

the continuous level collaboration and knowledge data provided at various points in time for each of the two groups.

Six participants did not complete the final knowledge test but continued to provide collaboration and knowledge data. These data were analyzed using repeated measures ANOVA. Results from this unplanned control group were used to evaluate if the educational intervention had an effect on either collaboration or knowledge scores. Given the small number of participants in this group, statistical power for concluding analyses was not obtained.

Conclusion

This chapter presented descriptions of the methodology and design used to investigate the research questions for this study. Descriptions of the research concepts, samples, setting, instruments, procedures, and statistical analyses were also presented.

CHAPTER 4

Introduction

Results of this quasi-experimental, pretest-posttest study are herein presented. Descriptive results appear first followed by findings related to research questions. Finally, additional analyses are presented.

Data Analysis

Data analyses were performed using Statistical Package for Social Sciences (SPSS) Graduate Pack 13.0 and 17.0 for Windows. A 2-tailed significance level of .05 was used for all analyses.

Descriptive Results

The study sample consisted of 88 registered nurses (RN) from two intermediate care units (IMCU; 46.6%), two intensive care units (ICU; 46.6%), and the critical care float pool (6.8%). To decrease contamination of IMCU results, critical care float participants were grouped with ICU participants because float nurses are regularly exposed to the knowledge and performance of nurses from intensive care settings.

The RN sample provided data about 535 episodes of nurse-physician collaboration (NPC), 352 of which addressed collaboration about eligible cardiac patients thus providing compliance results as well. Seventy-five percent of the RN sample identified themselves as staff nurses, 6.8% as admission nurses, and 18.2% as clinical managers or clinical educators. The study sample contained more Caucasians (95.5%), fewer females (87.5%), and more baccalaureate or higher prepared nurses (59.1%) compared with the 2004 National Sample Survey of Registered Nurses (NSSRN). In addition, the study sample was an average of 9.1 years younger than those in the NSSRN.

All four of these demographic characteristics were statistically different from the NSSRN at the $p < .0001$ levels. Table 4 presents comparative results of the proportion of selected demographic characteristics of the study sample and those of the NSSRN. Descriptive statistics of additional demographic characteristics of the study sample are presented in Tables 5 and 6.

Table 4. Comparison of Selected Demographic Characteristics of Study Sample with Data from 2004 National Sample Survey of Registered Nurses

Characteristic	Sample Data [$N = 88$]	National Sample Survey of Registered Nurses [$N =$ 35,724]	z - score (p value)
Age ($n = 87$)	37.7 years (10.5)	46.8 years (8.5)	8.07 (<.0001)
Caucasian	95.5%	81.8%	332.89 (<.0001)
Female	87.5%	94.3%	-274.36 (<.0001)
BSN or above	59.1%	47.2%	223.33 (<.0001)

BSN = Bachelor of Science degree in nursing

Table 5. Descriptive Data for Continuous Level Demographic Characteristics of Study Sample ($N = 88$)

Characteristic	Range	Mean (<i>SD</i>)
Years as an RN	0 - 37	10.15 (9.2)
Years at study hospital	0 - 30	8.33 (8.0)
Years in any critical care unit	0 - 33	9.14 (8.6)
Years in this critical care unit	0 - 29	6.44 (7.3)

RN = registered nurse

Table 6. Descriptive Data for Categorical Level Demographic Characteristics of Study

Sample ($N = 88$)

Characteristic	Frequency
Race:	
White, not of Hispanic origin	84 (95.5%)
American Indian or Alaskan Native	1 (1.1%)
Asian or Pacific Islander	1 (1.1%)
Hispanic	1 (1.1%)
Other	1 (1.1%)
Unit of Assignment:	
Intermediate Care	41 (46.6)
Intensive Care	41 (46.6)
Critical Care Float	6 (6.8)
Work Status:	
Permanent Assignment	69 (78.4%)
Per Diem	15 (17.0%)
Float	4 (4.5%)
Position:	
Staff Nurse	66 (75.0%)
Clinical Manager	14 (15.9%)
Admission/Discharge Nurse	6 (6.8%)
Clinical Educator	2 (2.3%)

Characteristic	Frequency
Initial Education ($n = 87$)	
Baccalaureate Degree	39 (44.8%)
Associate Degree	27 (31.0%)
RN Diploma	13 (14.9%)
LPN/LVN	8 (9.2%)
Highest Degree Earned	
Diploma	6 (6.8%)
Associate Degree	30 (34.1%)
Baccalaureate Degree	50 (56.8%)
Masters Degree	2 (2.3%)
Dichotomous Variables:	
Enrolled in Academic Program: No	84 (95.5%)
Gender: Female	77 (87.5%)
Currently Certified: No	73 (83%)
Participated in Pilot Study: Yes	22 (25%)

LPN/LVN = licensed practical nurse/licensed vocational nurse; RN = registered nurse

Attrition Rate

Flexible work schedules, lack of eligible discharge episodes, and other personal participant reasons may have contributed to the 37.5% attrition rate. Only two demographic characteristics, unit of assignment and work status, were significantly different between those participants who completed the study and those who did not. Intensive care settings had the highest attrition at 40.43%, with one ICU having 50% attrition, and the critical care float nurses having 66.7%.

The second demographic characteristic that was statistically different between those participants who completed the study and those who did not was work status. Clinical managers had the highest attrition at 50%. Table 7 provides descriptive statistics on participant attrition by unit of assignment and work status. The remaining 15 demographic characteristics were not significantly different between these two groups.

Table 7. Descriptive Statistics on Participant Attrition by Unit of Assignment and Work Status ($N = 88$)

Demographic Characteristic	Dropped out of Study/Total Number Consented	Attrition Rate
Unit of Assignment:		
Critical Care Float	4/6	66.7%
Medical ICU	12/24	50%
Surgical IMCU	12/27	44.4%
Cardiac ICU	3/17	14.6%
Medical IMCU	2/14	14.3%
Work Status		
Clinical Manger	7/14	50%
Staff RN	24/66	36.4%
Admission /	2/6	33.3%
Discharge RN		
Clinical Educator	0/2	0%

IMCU = intermediate care unit; ICU = intensive care unit; RN = registered nurse

Results

This section provides descriptions of possible range of scores, measurement times, and distribution of data for each dependent variable: knowledge, collaboration, and compliance. Findings that addressed each research question follow.

Knowledge Scores

Knowledge about the elements and processes of collaboration as well as about Centers for Medicare and Medicaid Services (CMS) outcome indicators expected for cardiac patients was measured at baseline, after exposure to the Collaboration and Satisfaction about Care Decisions (CSACD) instrument, and after the intervention. Possible scores were 0 – 26. Baseline mean knowledge scores were compared with mean knowledge scores measured after exposure to the CSACD. This comparison was to determine if exposure to questions about the critical attributes of collaboration, during baseline data collection, influenced participants' knowledge of collaboration. Because no difference was found ($n = 62$, $t = -1.687$, $p = .097$), results of the baseline knowledge scores were used as the pre-intervention scores in the remainder of analyses.

Baseline mean knowledge scores were slightly above 50%. This reflects a non-significant, negative skew that is likely due to professional knowledge related to collaboration and quality indicators that is common among RNs. Post-intervention knowledge scores for all critical care nurses were not significantly skewed. Table 8 displays descriptive statistics of knowledge scores both before and after the intervention.

Table 8. Unpaired Pre- and Post-intervention Descriptive Data for Outcome Variables from All Participants

Variable	Mean (SD)	(Min, Max)	Skew (Std Error of Skew)	Kurtosis (Std Error of Kurtosis)
Pre-intervention				
Knowledge score (<i>n</i> =85)	14.0 (2.2)	(9,19)	-.377 (.261)	-.227 (.517)
Collaboration (<i>n</i> =71)	30.8 (9.8)	(13.1, 49.0)	.239 (.285)	-.875 (.563)
Compliance with discharge quality indicators (<i>n</i> =63)	77.4 (18.1)	(25, 100)	-.880 (.302)	.987 (.595)
Post-intervention				
Knowledge score (<i>n</i> =55)	20.7 (2.4)	(14,25)	-.638 (.322)	.203 (.634)
Collaboration score (<i>n</i> =49)	32.7 (11.1)	(9.3, 49.0)	-.080 (.340)	-1.102 (.668)
Compliance with discharge quality indicators (<i>n</i> =45)	75.6 (19.8)	(25, 100)	-.941 (.354)	.856 (.695)

CSACD = Collaboration and Satisfaction about Care Decisions; min = minimum score; max = maximum score; std = standard

Collaboration Scores

Collaboration scores were measured at baseline and after exposure to the educational intervention. Possible scores ranged from 7 – 49. Median score for each of the seven critical attributes of collaboration was 4. The baseline mean collaboration score for all critical care nurses was 30.8, which is 63% of the total possible score. This score is higher than the median per question score, which would be 28. Given this high baseline perception of collaboration, the effect size of improvement was not likely to be as high as predicted. Baseline collaboration scores displayed a slightly positive, non-significant skew while post-intervention collaboration scores were nearly normally distributed. Table 8 displays descriptive statistics of collaboration scores.

This study provided reliability data about the CSACD from IMCU as well as ICU nurses. Cronbach's alpha data for this new population was .98. This is comparable to previously reported reliability from ICU and medical-surgical nurses for which reliability data ranges from .90 - .98 (Baggs, 1994; Baggs & Schmitt, 1995; Baggs et al., 1997; Dechario-Marino et al., 2001). These reliability statistics indicate that the CSACD is a reliable for making both group-level and individual level comparisons (Polit & Beck, 2004).

Compliance Rates

Compliance rates were also measured at baseline and after exposure to the educational intervention. Possible scores ranged 0 – 100%. The mean baseline compliance rate of 77.4% indicated much room for improvement, as 95% - 100% is expected in clinical practice (personal communication, T. Minton, April 2, 2009). Since compliance with regulatory indicators of quality is expected in the clinical arena, it is not

surprising that both baseline ($z = -2.91$) and post-intervention ($z = -2.66$) compliance data were significantly, negatively skewed at $\alpha = .01$ level (Tabachnick & Fidell, 2007).

Surprisingly, these data were not significantly skewed at the $\alpha = .001$ level. As recommended by a statistical consultant, the conservative α level was used due to the small sample size (Tabachnick & Fidell, 2007). Because these data were not significant at that level, no data transformation was indicated. Table 8 displays descriptive statistics about compliance rates.

Research Question 1: Is There a Difference Between Knowledge Scores (About Collaboration and Discharge Quality Indicators for Cardiac Patients) Before and After the Intervention?

Fifty-three participants provided both baseline and post-intervention knowledge scores, which are summarized in Table 9. Paired comparison of mean knowledge scores revealed a 6.36 post-intervention increase in knowledge about the elements and processes of NPC as well as knowledge about diagnosis-specific discharge quality indicators expected by the CMS for cardiac patients. This result indicates there was a significant increase in knowledge scores after the intervention for critical care nurses.

Table 9. Comparison of Pre- and Post-Intervention Paired Knowledge Scores for All Participants ($n = 53$)

Time	Mean	SD
Pre-intervention	14.26	2.1
Post-intervention	20.62	2.4
Difference	$t = -16.207, p < .0001$	

Research Question 2: Is There a Difference Between Collaboration Scores Before and After the Intervention?

A paired sample t test found no difference ($n = 49, t = -863, p = .392$) between the amount of collaboration perceived by critical care nurses before and after the educational intervention. Post hoc analysis indicated that the effect size of the difference in collaboration scores from time 1 to time 2 was .12. At an $n = 49$, these results had a power of .13. Based on paired means and standard deviations of pre- and post-intervention collaboration scores, presented in Table 10, an n of 550 would have provided a power of .80.

Table 10. Comparison of Pre- and Post-Intervention Paired Collaboration Scores for All Participants ($n = 49$)

Time	Mean	SD
Pre-intervention	31.43	10.6
Post-intervention	32.73	11.1
Difference	$t = -.863, p = .392$	

Research Question 3: Is There a Difference Between Compliance Rates with Diagnosis-Specific Discharge Quality Indicators for Cardiac Patients Before and After the Intervention?

A paired sample t test found no difference ($n = 43, t = .316, p = .754$) between compliance rates with diagnosis-specific discharge quality indicators for cardiac patients before and after the educational intervention. Post hoc analysis indicates the effect size of the difference in compliance rates from time 1 to time 2 was .07. At an $n = 43$, these results had a power of .07. Based on paired means and standard deviations of pre- and post-intervention compliance rates, presented in Table 11, an n of 1,640 would have provided a power of .80.

Table 11. Comparison of Pre- and Post-Intervention Paired Compliance Rates for all participants ($n = 43$)

Time	Mean	SD
Pre-intervention	77.43	15.8
Post-intervention	76.24	18.3
Difference	$t = .316, p = .754$	

Research Question 4: Is There a Relationship Between Nurse-Perceived Nurse-Physician Collaboration and Compliance Rates with Diagnosis-Specific Discharge Quality Indicators for Cardiac Patients (Beta Blockers, Angiotensin Converting Enzyme Inhibitors, Aspirin, Assessment Of Left Ventricular Systolic Function, Smoking Cessation Counseling, Discharge Instructions)?

Parametric analysis of correlation between NPC and compliance with diagnosis-specific discharge quality indicators found no significant correlation either before ($n = 71, r = .134, p = .294$) or after the intervention ($n = 49, r = -.239, p = .114$). Scatterplots for the whole group and also for the IMCU and ICU nurses separately supported these findings.

Research Question 5: Is There a Difference in Knowledge Scores (About Collaboration And Discharge Quality Indicators for Cardiac Patients) Between Nurses from Intermediate Care Units and Nurses from Intensive Care Units Before or After an Educational Intervention?

Repeated measures ANOVA was used to analyze mean knowledge scores for each of two groups (IMCU [$n = 26$] and ICU [$n = 27$] at two different times (before and after the intervention). Although there was no significant interaction between group and time (Wilk's Lambda = .999, $F[1,51] = .049$, $p = .826$, partial eta squared = .001), there was a significant main effect of time on knowledge scores (Wilk's Lambda = .165, $F[1,51] = 257.651$, $p < .0001$) with a very large effect size (Cohen, 1988), partial eta squared = .835. Analysis of the main effect of group on knowledge was not significant between IMCU and ICU participants ($F = 2.062$, $p = .157$, partial eta squared = .039). Post hoc analysis of knowledge scores by group indicates a power of .06 was achieved with the study sample. An n of 3,144 would have provided a power of .80. Table 12 provides a summary of paired results of repeated measures ANOVA between IMCU and ICU nurses. These results indicate that the educational intervention was effective in increasing knowledge about the elements and processes of collaboration among all critical care nurses but there was no difference in improvement between IMCU or ICU groups.

Data were also analyzed for significance of skewness and kurtosis. While pre-intervention knowledge scores of ICU nurses were highly negative (skew = -.718, standard error of skew = .448), they were non-significantly skewed ($z = -1.603$). Likewise, post-intervention scores, which were expected to be negatively skewed,

approached statistical significance for IMCU nurses only (ICU $z = -1.125$; IMCU $z = -1.929$). These results indicate that the intervention did not improve knowledge held by the ICU nurses as dramatically as it did for the IMCU nurses. Table 13 displays descriptive data about pre- and post-intervention knowledge scores by group.

Table 12. Results of Repeated Measures ANOVA between IMCU and ICU Nurses for Knowledge and Collaboration using paired results

Variable	Mean (<i>SD</i>) for IMCU	Mean (<i>SD</i>) for ICU	<i>Df</i> (hypothesis, error)	<i>F</i>	<i>P</i>	η^2
Knowledge	T1: 13.96 (2.1) T2: 20.23 (2.3)	T1: 14.56 (2.2) T2: 21.00 (2.4)	(1,51)	.049	.826	.001
Collaboration	T1: 27.21 (9.6) T2: 30.81 (12.1)	T1: 35.48 (10.1) T2: 34.24 (9.8)	(1,45)	2.426	.126	.051

IMCU = Intermediate care unit; ICU = Intensive care unit; T1 = baseline; T2 = post-intervention

Table 13. Pre- and Post-Intervention Knowledge Scores by Group (All Participants Included)

Group	Pre-intervention Mean (<i>n</i> , <i>SD</i>)	Post-intervention Mean (<i>n</i> , <i>SD</i>)
IMCU	13.96 (26, 2.1)	20.37 (27, 2.4)
ICU	14.56 (27, 2.2)	20.93 (28, 2.4)

Research Question 6: Is There a Difference in Collaboration Scores Between Nurses from Intermediate Care Units and Nurses from Intensive Care Units Before or After an Educational Intervention?

Repeated measures ANOVA was used to analyze mean perceived collaboration scores for each of two groups (IMCU [$n = 24$] and ICU [$n = 23$]) at two different times (before and after the intervention). There was no significant interaction between group and time, Wilk's Lambda = .949, $F(1,45) = 2.426$, $p = .126$, partial eta squared .051. There was also no significant main effect of time on collaboration scores, Wilk's Lambda = .987, $F(1,45) = .579$, $p = .450$, partial eta squared = .013. Post hoc power analysis confirmed that these analyses achieved a power of .89.

The main effect comparing perceived collaboration scores by group (IMCU or ICU) was significant ($F = 4.969$, $p = .031$) with a moderate to large (Cohen, 1988) effect size (partial eta squared = .099). This between-groups comparison suggests that there was a difference in perceived collaboration scores based on group alone. Comparison of mean perceived collaboration scores was then made using independent sample t tests to determine which scores, pre- or post-intervention, were responsible for the between

groups difference. Results of these comparisons indicated that IMCU participants perceived collaboration scores were 7.27 lower than ICU participants before the intervention ($t = 3.21, p = .002$) but not significantly different after the intervention ($t = 1.06, p = .293$). These results indicate that IMCU nurses perceived less collaboration with physicians before the intervention than did ICU nurses but similar amounts of collaboration as ICU nurses after the intervention. This finding is further supported by the large, positive skew (.830) of baseline collaboration scores of the IMCU nurses, which approached statistical significance ($z = 2.03$). Skewness of no other collaboration results, by group, approached statistical significance. Descriptive statistics comparing perceived collaboration scores for all participants, separated by group, are displayed in Table 14.

Table 14. Pre- and Post-Intervention Perceived Collaboration Scores by Group (All Participants Included)

Group	Pre-intervention Mean (<i>n</i> , SD)	Post-intervention Mean (<i>n</i> , SD)
IMCU	26.97 (33, 9.5)	30.81 (24, 12.1)
ICU	34.24 (34, 9.1)	34.24 (23, 9.8)
Differences Between Groups	7.27 ($p = .002$)	3.43 ($p = .293$)

Additional Results

Additional parametric analyses were performed to determine if any of the 15 reported demographic characteristics contributed to the prediction of knowledge, nurse-perceived NPC, or compliance with diagnosis-specific discharge quality indicators. Pre-intervention outcome scores were used in these comparisons because they represented true outcome scores of the participants, uninfluenced by the intervention.

Collaboration

Baseline collaboration scores were used to compute relationships with the 15 demographic characteristics reported by the participants. Three continuous level demographic characteristics: age, year of initial RN graduation, and years as an RN and three categorical level characteristics: unit of assignment, participation in a previous pilot study, and initial education, were associated with baseline collaboration scores. Results of the correlation between continuous level characteristics and collaboration are displayed in Table 15.

A one-way ANOVA was used to analyze differences between nurses who did and did not participate in the pilot study. There was a significant difference in the baseline collaboration scores of those who did ($n = 20$) and those who did not ($n = 47$) participate in the pilot study ($F = 9.328, p = .003$), with mean scores confirming higher perceptions

of collaboration among those who did not previously participate in the pilot study than those who did participate ($M = 32.9$, $SD = 9$ vs. $M = 25.3$, $SD = 8.7$).

Results of a one-way ANOVA revealed a significant difference in mean baseline perceived collaboration scores by unit of assignment ($F = 2.814[4]$, $p = .033$). Post hoc comparison using the Tukey HSD test indicated that the mean scores of nurses from the medical ICU ($M = 35.3$, $SD = 9.4$) differed significantly ($p = .034$) from mean scores of nurses from the surgical IMCU ($M = 25.9$, $SD = 8.2$). Differences between nurses from other units of assignment were not significant.

A separate one-way ANOVA confirmed that mean perceived baseline collaboration scores were also different based on initial education ($F = 3.016[3]$, $p = .037$). Post hoc comparison using the Tukey HSD test indicated that the mean scores of nurses initially educated as a diploma RN ($M = 23.5$, $SD = 10.3$) were significantly lower ($p = .051$) than those nurses initially educated as associate degree RNs ($M = 33.5$, $SD = 9.0$). Mean scores between nurses initially educated as licensed practical nurses and baccalaureate degree RNs were not significantly different from any other group. No other demographic characteristics were related to baseline perceptions of collaboration.

Table 15. Relationship of Continuous-Level Demographic Characteristics with Baseline Collaboration Scores in All Participants

Demographic Characteristic	Collaboration
Age	$r = -.258$ ($p = .036$)
Year of initial graduation	$r = .277$ ($p = .025$)
Years as an RN	$r = -.315$ ($p = .009$)

Knowledge and Compliance

None of the 15 demographic characteristics reported was related to either baseline knowledge or baseline compliance scores.

Comparison Between Those Who Did and Did Not Complete a Post-Intervention

Knowledge Test

A small number of participants ($n = 6$) continued to provide collaboration and compliance data throughout the study without completing the final post-test. It is unknown if these participants completed the educational intervention or not. Mean scores during time 2 data collection revealed no differences in either perceived collaboration ($t = -.033, p = .974$) or compliance rates ($n = 5, t = .354, p = .725$) between those who did and did not complete the posttest.

Regression Results

Three continuous level demographic characteristics (age, years as an RN, and year of initial RN graduation) and three categorical level characteristics (participation in pilot, unit of assignment, and initial education) were significantly related to baseline collaboration scores. Because year of initial RN graduation and years as an RN actually measure the same attribute, years as an RN was chosen to represent this characteristic. Subsequently, five variables were entered into a general linear model. A main-effects model using these five variables satisfied the test for homogeneity of variance (Levene's: $F = 1.566, p = .105$). In the resulting model of significant fit ($p = .010$), none of the five demographic characteristics was a significant predictor of baseline collaboration.

Summary

The primary purpose of this research study was to determine the effect of an educational intervention on knowledge about the elements and processes of collaboration as well as about diagnosis-specific discharge quality indicators, expected by the CMS for cardiac patients, among critical care nurses. A second aim was to determine the effect of that educational intervention on two outcome indicators: nurse-perceived NPC and compliance with diagnosis-specific discharge quality indicators. Data supported improved knowledge for all critical care nurse participants after the intervention without improvement of either outcome measure. No relationship between collaboration and compliance was detected. No difference existed in baseline knowledge scores between participants from intensive care settings and those from intermediate care settings. Although participants from intermediate care settings perceived increased collaboration after the intervention, there was no difference in collaboration for participants from intensive care settings.

CHAPTER 5

Discussion

For new research findings to be translated into clinical practice, interpretation of statistical results must be discussed and findings reconciled with existing evidence. This chapter presents discussion organized as follows: attrition rate, findings related to specific research questions, and discussion of additional results, fit with theoretical framework, strengths and limitations, and additional opportunities for future research. Comparison of study results with previous evidence, clinical implications of findings, and research opportunities are presented within each section. The chapter ends with conclusions about this research study.

Attrition Rates

This study had a higher overall attrition rate of registered nurse (RN) participants than expected, thus raising concerns about biased results (Polit & Beck, 2004). Several factors may have contributed to this high attrition rate. Data collection spanned 12 weeks, and completion of the educational intervention required approximately 35 minutes. This extended commitment of time and effort likely precipitated the attrition of some participants. Some intensive care unit (ICU) RNs verbalized concern and embarrassment over not knowing the answers to the knowledge test. This may have been perceived as a threat to those nurses (Bastable, 2008), contributing to the attrition rate, particularly from the ICU group. Finally, unit specific challenges such as high acuity, high census, minimal staffing on select days, and inadequate skill mix may have acted additively, resulting in less RN time available to collaborate or to complete the research tools. These factors may have combined to contribute to the higher than expected attrition rate.

Two demographic characteristics, unit of assignment and work status, were significantly different between those participants who did and did not complete the study. Unit of assignment was most different. One ICU had a 50% attrition rate. This exceedingly high rate is likely due to the fact that this unit physically moved to a different area of the hospital during the data collection phase. This move disrupted the normal milieu of the unit and may have affected cooperation with the study, time available to participate, collaboration with physicians, or a combination of the three. This attrition rate may also have been influenced by the fact that all interested RNs (89% participation rate from intensive care settings) were initially consented to participate in the study but it was later discovered that transfers or discharges on the evening/night shifts were only permitted from that ICU in the event of an emergency. As a result, many consented participants who worked evening and night shifts did not have any eligible episodes upon which to report collaboration.

Critical care float nurses also accounted for a larger than expected attrition rate. This may be related to lack of personal contact with the researcher. Given the nature and schedule of the position, float RNs may not have been physically present on the study units during the days or times when the researcher was present.

The second demographic characteristic related to attrition was work status. Clinical managers had a higher than expected attrition rate. This may be reflective of the fact that clinical managers from the intermediate care units (IMCU) rarely have a patient assignment thus may not have had the opportunity to report collaboration about eligible discharge episodes.

Discussion Related to Research Questions

Research Question 1: Is There a Difference Between Knowledge Scores (About Collaboration and Discharge Quality Indicators for Cardiac Patients) Before and After the Intervention?

The significant difference in knowledge scores of critical care nurses before and after the intervention indicated that the educational intervention contributed to an increase in the amount of knowledge about collaboration and diagnosis-specific discharge quality indicators held by critical care nurses. This finding supports previous evidence that self-paced learning activities are an effective alternative to teacher-directed education strategies (Bastable, 2008).

Research Question 2: Is There a Difference Between Collaboration Scores Before and After the Intervention?

Although post-intervention knowledge scores indicated improved knowledge related to the elements and processes of nurse-perceived nurse-physician collaboration (NPC) as well as diagnosis-specific discharge quality indicators for cardiac patients, critical care nurses did not perceive higher levels of collaboration following the intervention. This indicates that although there was a change in knowledge, no change in the clinical performance of collaboration with physicians was perceived by the critical care nurses. This finding supports previous evidence that knowledge does not necessarily result in improved performance (Fonarow et al., 2007; Fonarow et al., 2005; Jha et al., 2005; LaBresh et al., 2007; Nicol et al., 2008). This finding is also congruent with evidence from an intervention study reported by Dechario-Marino and associates. They

found no difference in nurse-perceived NPC before and after a multi-stage intervention aimed at improving collaboration (Dechario-Marino et al., 2001).

One reason for the lack of perceived improvement in NPC may be related to the smaller than expected change in this variable, from baseline to post-intervention. Pre-study power analysis estimates were based on a change of 7 points between pre- and post-intervention collaboration. Given the relatively small change in amount of perceived NPC, a much larger sample of critical care nurses would have been necessary to find a difference, if one existed. Difficulty detecting such a small difference represents a challenge to the provision of research support for the theoretical model. Very large samples will be needed for future studies aimed at investigating the theoretical link between antecedent knowledge and perceived NPC.

Research Question 3: Is There a Difference Between Compliance Rates with Diagnosis-Specific Discharge Quality Indicators for Cardiac Patients Before and After the Intervention?

Conclusions about the second outcome measure also supported previous research that changes in knowledge do not necessarily result in changes in performance (Fonarow et al., 2007; Fonarow et al., 2005; Jha et al., 2005; LaBresh et al., 2007; Nicol et al., 2008). Although post-intervention knowledge scores indicated improved knowledge about the diagnosis-specific discharge quality indicators of best clinical practices for cardiac patients, as recommended by the Centers for Medicare and Medicaid Services (CMS), retrospective review of medical records did not reveal an improvement in compliance rates with these clinical practices following the intervention.

The finding of no difference in the outcome measure of compliance is not surprising because previous evidence about the relationship between NPC and patient outcomes is inconclusive. In fact, this finding is actually supportive of the theoretical model that guided this study. According to the Baggs and Schmitt model of NPC (Baggs & Schmitt, 1997), changes in the core process of collaboration should lead to changes in the outcome of patient care. Because the participants in this study reported no change in collaboration, no change in compliance with discharge quality indicators was expected, despite increased knowledge about CMS practice expectations.

Research Question 4: Is There a Relationship Between Nurse-Perceived Nurse-Physician Collaboration and Compliance Rates with Diagnosis-Specific Discharge Quality Indicators for Cardiac Patients (Beta Blockers, Angiotensin Converting Enzyme Inhibitors, Aspirin, Assessment Of Left Ventricular Systolic Function, Smoking Cessation Counseling, Discharge Instructions)?

No correlation was found between amounts of nurse-perceived NPC and compliance with diagnosis-specific discharge quality indicators. This finding is not surprising as previous evidence about a relationship between NPC and patient outcomes is mixed (Baggs et al., 1999; Curley et al., 1998; Higgins, 1999; Knaus et al., 1986; Nakanishi et al., 2006).

Because medical records frequently do not provide complete documentation of all care provided (Larrabee et al., 2001), their use as the data source for measures of compliance with quality indicators may not have provided the most sensitive data with which to evaluate this relationship. This result also implies that other factors, such as

available nursing time or knowledge about the importance of patient education, may be related to compliance with diagnosis specific discharge quality indicators.

The manner in which staff nurses at the study hospital used the pre-printed discharge instruction sheets may also have contributed to these non-significant results. Although pre-printed instruction sheets include prompts for all six-quality indicators recommended for cardiac patients by the CMS, actual compliance with these indicators remained relatively low. This finding suggests that rather than individualizing discharge instructions for each patient, staff nurses may be conducting a rote review of the pre-printed instruction sheets. For example, although there is a pre-printed statement on the discharge sheet addressing the recommendation to stop smoking, there was a noted lack of documentation related to smoking cessation counseling by critical care nurses. Because few nursing entries about this indicator were found during inpatient stays, it might also be true that patient education related to other indicators, such as discharge instructions about diet, exercise, and discharge medications may only have been addressed on discharge and not during the hospital stay. Adequate patient education about these important issues of care may not be best accomplished at a time when the patient is distracted by the circumstances of impending discharge. Thus, measured compliance rates might actually have been more reflective of compliance with the use of the discharge instruction sheet rather than with actual patient outcomes. Because performance-based payments are directly linked with documented compliance with quality indicators (Centers for Medicare and Medicaid Services, 2005, 2008) and the financial incentives for compliance increase commensurately, this finding provides important information to nurse managers and hospital administrators. Also, because

compliance rates are based on documentation that may be inaccurate or incomplete (Larrabee et al., 2001), measurement of actual outcomes, such as improvement in left ventricular systolic function, adherence with medication regimen, or decline in the number of cardiac patients who smoke, may provide a more accurate assessment of the relationship between perceived collaboration and patient outcomes. Finally, the finding of no relationship between collaboration and compliance might actually be supportive of the theoretical model. According to the model, changes in collaboration lead to changes in patient outcomes. Then it logically follows that no change in outcomes would result if there was not a change in collaboration. Thus, because participants in this study reported no change in collaboration, no change in the outcome of compliance was expected.

Research Question 5: Is There a Difference in Knowledge Scores (About Collaboration And Discharge Quality Indicators for Cardiac Patients) Between Nurses from Intermediate Care Units and Nurses from Intensive Care Units Before or After an Educational Intervention?

Knowledge about the elements and processes of collaboration as well as diagnosis-specific CMS discharge quality indicators for cardiac patients improved after the intervention but this improvement was for critical care nurses in general and not intermediate care unit (IMCU) or intensive care unit (ICU) nurses specifically. These results support the contributions of both in-service and continuing education for nurses from various clinical settings (Avillion, 2001; Bastable, 2008). Although no reported results of similar interventions were found in the literature, one research group (Dechario-Marino et al., 2001) reported perceptions of NPC before and after a multi-stage intervention. The intervention included one 4-hour classroom session “focused on

problem solving, decision making, and building successful teams” (Dechario-Marino et al., p. 226). Perceptions of NPC were measured using the Collaboration and Satisfaction about Care Decisions (CSACD), however, these researchers did not measure knowledge about collaboration.

The finding of the current study, that knowledge about the elements and processes of collaboration can be improved by an educational intervention, provides a unique contribution to nursing science. This provides further support for education about collaboration early in the employment tenure of newly hired nurse. In addition, this finding provides new opportunities for both nurse researchers and education researchers. Additional studies evaluating the effectiveness of this intervention are needed to confirm the results of this study. In addition, longitudinal studies are needed to investigate the status of this knowledge increase over time.

Research Question 6: Is There a Difference in Collaboration Scores Between Nurses from Intermediate Care Units and Nurses from Intensive Care Units Before or After an Educational Intervention?

Before the intervention, IMCU nurses perceived less collaboration with physicians than did ICU nurses, thus had more room for improvement of this outcome variable. The differences in amounts of perceived collaboration relate to primary workflow and environmental differences inherent in IMCU and ICU settings such as proximity of work area, lower patient: nurse ratios, or more frequent contact with physicians in intensive care settings. In contrast, the amount of collaboration perceived by IMCU nurses after the intervention was not different than that perceived by ICU nurses. This finding suggests that the educational intervention may have influenced the

perception of collaboration by IMCU nurses. This influence appears to have been positive, with the IMCU and ICU nurses perceiving comparable amounts of collaboration with physicians following the educational intervention. This finding is important for clinical educators. Because perceptions of collaboration may influence collaborative behaviors, interventions to improve such perceptions would provide more return on investment if implemented earlier in the employment tenure. In addition, because IMCU nurses have more room for improvement of perceptions about NPC, programs that include education on collaboration might be important additions to initial orientation sessions, as well as subsequent competency validations, for IMCU nurses. The inclusion of such classes may improve not only nurses' perceptions of collaboration with physicians but research suggests such improvements may also lead to fewer negative patient outcomes and shorter lengths of stay (Baggs et al., 1992; Baggs et al., 1999; Jitapunkul, 1995; Nakanishi et al., 2006).

Amounts of nurse-perceived NPC, measured by the CSACD, have been reported in other studies for both ICU and medical-surgical nurses. Previously reported amounts of nurse-perceived NPC range from 26.6 to 30.7 among ICU and medical-surgical nurses (Baggs et al., 1997, p. 397; Dechario-Marino et al., 2001, p. 229). One higher amount, 34.4, was reported during the development of the CSACD, however that amount reflected data provided by both ICU nurses and resident physicians (Baggs, 1994, p. 180). This amount is likely higher due to physician input, as physicians have been found to report higher levels of collaboration than their RN counterparts (Baggs et al., 1992; Baggs et al., 1997). For the current study, baseline amounts of nurse-perceived NPC were 27.0 for IMCU nurses and 34.2 for ICU nurses. The higher baseline reports by ICU nurses may be

reflective of closer relationships between nurses and physicians in community hospital settings. No resident physicians rotate through this ICU, but rather a small number of attending and consulting physicians interact with the ICU nursing staff. This provides more opportunities for collaborative relationships to develop. The higher than expected baseline perceptions of NPC may account for the non-significant results, as these ICU nurses may have already perceived the threshold level of collaboration before completing the educational intervention.

These findings were further corroborated in that nurses assigned to the surgical IMCU perceived much lower NPC than nurses assigned to the medical ICU. Comparison of the average number of years as an RN between the staff members of the two IMCUs reveals that the surgical IMCU nurses had more years of experience. The finding that the IMCU nurses who perceived lower collaboration had higher years of experience as an RN supports the subsequently discussed relationship between years as an RN and nurse-perceived NPC.

Discussion of Additional Results

Regression Results

None of the demographic characteristics predicted knowledge, nurse-perceived NPC, or compliance with diagnosis specific discharge quality indicators for cardiac patients. This finding provides a unique contribution to nursing science, as the predictive ability of demographic characteristics has not been previously reported in the literature. Despite the lack of predictive ability of the demographic characteristics, some relationships were identified between demographic characteristics (age, years as a nurse, year of initial graduation, unit of assignment, participation in the pilot study, and initial

education as an RN) and perceived collaboration. These relationships indicated that RNs with less experience perceived higher amounts of collaboration between nurses and physicians. This finding may be related to recent changes in RN curricula which now have an increased focus on behaviors supportive of collaboration and the importance of interdisciplinary collaboration (*The essentials of baccalaureate education for professional nursing practice*, 1998). These results may also indicate that more experienced RNs have a higher expectation of collaborative exchanges and, thus, perceive less collaboration when the exchange is not up to their expectations. Alternately, less experienced RNs may have lower expectations of collaborative exchanges with physicians and, thus, perceive higher amounts of collaboration than may actually exist. Research examining the relationship of demographic characteristics and collaboration, measured by the CSACD, has not been previously reported. One researcher did report non-significant relationships between demographic variables and collaboration indicators, measured by the Collaborative Practice Scales (Patronis-Jones, 1994). The inconsistency of these results may be related to the differences between the two scales: the Collaborative Practice Scales measures two critical attributes of collaboration, assertiveness and cooperativeness (Weiss, 1985), and the CSACD measures five additional critical attributes of collaboration: planning, communication, shared decision-making, satisfaction, and coordination (Baggs, 1994).

The discovery of relationships between some demographic characteristics and nurse-perceived NPC provides opportunities for future research. The lack of predictive ability of any of these characteristics suggests that some antecedent conditions may have synergistic influences on the amount of nurse-perceived collaboration or that the absence

of specific antecedent conditions may negate the positive influence of other antecedents. Alternately, the lack of predictive ability of any of these characteristics might be due to the small size of this research sample. Future researchers investigating relationships between antecedent conditions may reveal important information for the nurse managers and administrators to consider when re-evaluating care delivery processes and the organization and coordination of nursing care. In addition, research about additional demographic characteristics may provide valuable information for the recruitment of more effective nurse collaborators. Finally, future research into possible relationships between demographic characteristics and NPC may provide information about the amount of collaboration perceived by various demographic groups of nurses. Knowledge about which demographic characteristics are related to higher levels of nurse perceived NPC might help nurse managers make more effective hiring and promotion decisions. In addition, this information may help nurse educators plan educational programs targeted for specific populations. Both would result in better matching of services with appropriate human resources, thus potentially saving both time and money for healthcare institutions.

Pilot study and collaboration scores

Twenty IMCU nurses participated in a pilot study evaluating the CSACD. No ICU nurses participated in that pilot. Comparison of baseline perceptions of collaboration was examined between those who did and did not participate in the pilot study to ascertain if previous exposure to the CSACD positively influenced baseline perceptions of collaboration. Results indicated that previous exposure to this tool did not positively influence baseline perceptions about collaboration. In contrast, nurses who did not

participate in the pilot study reported a 7.6 higher mean baseline collaboration score than those who did participate. This supports previously described findings of this study that ICU nurses perceived higher baseline collaboration than did IMCU nurses. This finding provides information that previous exposure to the CSACD did not contaminate the research sample.

ADN vs. Diploma as Initial Nursing Education

Registered nurses initially educated in diploma programs perceived lower collaboration with physicians than did those initially educated in associate degree programs (ADN). This finding is most likely associated with differences in clinical opportunities and student demographics rather than curricula. Associate degree programs are allied with community colleges. As such, nurses educated in ADN programs complete clinical rotations at multiple healthcare facilities and, thus, experience multiple professional environments (S. Shannon, personal communication, February 13, 2009). These diverse experiences provide them a variety of clinical climates in which to observe and experience collaboration between nurses and physicians. In addition, these diverse experiences are accompanied by exposure to a variety of physicians with whom ADN students interact. In contrast, diploma programs are generally hospital-based, providing clinical rotations in only one healthcare environment (S. Kaptzy, personal communication, February 13, 2009) and, thus, students are exposed to only one clinical climate in which to experience NPC. While diploma RN students may complete specialty clinical experiences at a university-affiliated hospital, these experiences are often observation only (S. Kaptzy, personal communication, February 13, 2009) and do not afford the

diploma RN students the opportunity to interact, on a professional level, with physicians from this diverse setting.

Demographically, since 2000, more licensed practical nurses (LPN) have completed ADN than diploma programs for their RN education (Bureau of Health Professions, 2004, p. A4). Because LPNs have some experience with professional interactions with physicians and may have seen collaboration role-modeled by the RNs with whom they have worked, these students may bring more knowledge and skills of collaboration with them to their RN role than do diploma nurses. Both of these conclusions indicate that ADN nurses may be more socialized into the healthcare setting than are diploma nurses. This finding offers information for both academic and clinical educators. Attention to academic objectives related to NPC needs to be re-evaluated, particularly in diploma RN programs. Simulation scenarios may provide a feasible method to address this educational deficit. Clinically, this finding may provide nurse managers with useful information related to hiring and promotion decisions. This finding also provides clinical educators information with which to individualize orientation, mentoring, and continuing education programs for diploma educated RNs.

No evidence supporting this explanation was found in previous literature thus, this explanation provides only one possibility for these otherwise spurious findings. In addition, the lack of difference between collaboration perceived by nurses initially educated at the baccalaureate level and those initially educated at other levels further suggests the spurious nature of this finding. Additional research investigating the differences in baseline NPC perceived by RNs from various initial education backgrounds is needed to fully understand these results.

The findings about previous exposure to the CSACD and differences in nurse-perceived NPC between ADN and diploma nurses were incidental findings from the data collected in this study. No research questions directly addressed these findings. Because possible relationships exist between these characteristics and nurse-perceived NPC, future research studies addressing these relationships may provide unique findings to nursing science.

Fit with Theoretical Framework

This was the first study to use the Baggs & Schmitt model of NPC (Baggs & Schmitt, 1997) to investigate the relationship of an antecedent condition, knowledge, with the core process of collaboration. In addition, no previous researchers have reported differences in knowledge about collaboration after an educational intervention. Although an increase in the antecedent condition of knowledge did result in an increase in collaboration perceived by IMCU nurses, it did not change the amount perceived by ICU nurses. The improved collaboration perceived by IMCU nurses supports the theoretical model. The lack of support of the model by results from ICU nurses may be a function of the perception of high levels of collaboration at baseline, thus reflecting little room for improvement in this subset.

Further research is needed to test the relationships identified by the Baggs & Schmitt model of NPC. Investigations about the compound influence of multiple antecedent conditions should be pursued as one may not exist, or be altered, without affecting others. No association was found between collaboration and the outcome indicator of compliance. Because no change in the amount of nurse-perceived

collaboration was detected by this study, no change in compliance was expected, according to the theoretical model.

Strengths and Limitations

Strengths of this study were the use of a reliable and valid tool to measure NPC, use of best evidence outcome indicators identified by CMS, and use of participants as their own control. The latter design strategy eliminated the influence of personal values, beliefs, and behaviors that may have acted as extraneous variables on perceptions of collaboration.

Limitations in the study design may have contributed to non-significant results. The use of a small, non-representative, convenience sample as well as the use of a self-report instrument may have affected study results. Self-report instruments are inherently subject to response bias as well as social desirability response bias (Polit & Beck, 2004). Not only might the RN participants have mis-represented their true perceptions of collaboration, they might have falsely inflated their scores because of their belief that nurses should collaborate effectively with physicians. Awareness of recent reports on the gravity of medical errors, the role a lack of interdisciplinary collaboration plays in the perpetuation of such errors, and the expectation of improved collaboration (Institute of Medicine, 2001, 2003) might have precipitated falsely high collaboration scores reported by these critical care RNs or contributed to the high attrition rates documented in this study.

Differences in expectations and practices of collaboration with physicians may have existed between nurses from IMCU and ICU. Individual physician coverage as well as patient acuity, unit activity, staffing mix, and staffing ratios on individual nursing units

may have been extraneous variables influencing collaboration between nurses and physicians. Nurses' perceptions of their own knowledge base, experiences, and self-esteem may have influenced their participation in or perception of collaboration. Finally, levels of unmeasured antecedent conditions, such as time or interest, may have changed over the course of data collection thus influencing the amount of nurse-perceived NPC.

Small effect size and low power of some analyses were also limitations of this study. Effect sizes of outcomes variables were estimated to be higher than actually observed, thus the sample size of this research study did not afford a power of .80 for many statistical analyses. Post hoc analyses that support this limitation were reported in Chapter 4.

Another limitation may have been the educational intervention, developed by the researcher. Although this intervention was tested for content and face validity by RNs representing expertise in education, collaboration, and clinical practice, the intervention was not previously tested and may not have been sufficiently robust to adequately increase perceived collaboration. This may have influenced the ability of these research data to detect a difference in outcome behaviors reflected by compliance with CMS diagnosis-specific discharge quality indicators for cardiac patients.

The use of compliance with diagnosis-specific discharge quality indicators as an intermediate outcome may also represent a limitation of this study. Although chosen because it represented an outcome of which staff nurses may be immediately aware, the use of compliance with these indicators as a proxy for actual patient outcomes may not have provided a sensitive enough variable to detect minor differences in perceived collaboration.

Omission of physician-perceived collaboration and of education of physicians represents another limitation. The addition of the physician data would have provided a different vantage point about whether or not the educational intervention resulted in any differences in perceived collaboration. Although the addition of perceptions of this half of the care-giving dyad would have been desirable to include, lack of physician participation in a previous pilot study (Clutter, 2007), negated this possibility. In addition, previous research findings support that physician-perceived NPC is not related to patient outcomes (Baggs et al., 1992; Baggs et al., 1999).

Finally, the assumption that medical and nursing documentation provided a complete and accurate account of the care provided during this and previous hospitalizations is a huge assumption and a definite scientific limitation. Although they provide the only legal account of patient care, research evidence supports that medical records do not reflect all interactions between patient and caregivers or between groups of professional caregivers (Larrabee et al., 2001). Anecdotally, this same conclusion is widely acknowledged among both nurse managers and risk managers (personal communication, A. Bridge, February 2, 2009; personal communication D. Myers, Feb 10, 2009).

Unique Contributions of this Study to Nursing Science

This study provided five unique contributions to nursing science. First, the demographic characteristics of this study sample differed from those of the aggregate sample from which data about collaboration and patient outcomes has been previously reported. This study sample consisted of younger nurses, a larger percentage of male nurses, and a larger percentage of nurses with at least a Bachelor of Science degree in

nursing (BSN). Because of these differences, the data from this study provided unique contributions to previously reported aggregate data. Second, this study contributed data from intermediate care units, a previously unreported care setting. Third, this study contributed data from a non-teaching, non university-affiliated, rural community hospital, a previously under-represented fraction of the population that employs critical care nurses. Fourth, this study contributed outcome data about compliance with regulatory criteria, a previously unstudied patient outcome. Fifth, this is the first interventional study to test the Baggs and Schmitt model of NPC (Baggs & Schmitt, 1997).

Additional Opportunities for Future Research

Recent attention to nurse-physician collaboration has been fueled by reports from the Institute of Medicine and the public disclosure of the magnitude of sequelae of medical errors (Institute of Medicine, 2001, 2003; O'Neil & Commission, 1998). The results of this study provided important information on the power and effect sizes of the differences for three clinical outcome variables: knowledge, nurse-perceived NPC, and compliance with diagnosis-specific discharge quality indicators. This information is important for future interventional studies related to collaboration as well as larger studies investigating relationships among demographic variables.

A measurement of actual patient outcomes may be a better indicator of changes in collaboration than the intermediate outcome of compliance with quality indicators. Patient reported cessation of smoking, adherence to dietary sodium restrictions, validation of knowledge of self-care after discharge, and patient verbalization of when to seek medical attention related to heart failure symptoms are a few examples of actual patient outcomes that could be measured in cardiac patients. Shorter lengths of stay,

reduced levels of chronic pain, or implementation of active strategies to correct deficient albumin levels in acutely ill patients are a few examples of actual patient outcomes that could be studied in other patient populations.

Conclusion

The educational intervention was effective in increasing the knowledge of critical care nurses about the elements and processes of NPC as well as about compliance with diagnosis-specific discharge quality indicators. Despite this finding, definitive links between improved nurse-perceived NPC and positive patient outcomes remain elusive to quantitative analysis. This gap may be related to the fact that staff RNs must rely on physicians to prescribe most therapies that ultimately impact such outcomes. Additionally, this gap may indicate that retrospective review of medical records does not provide evidence of actual patient outcomes and that future research should focus on collecting data from patients about their actual outcomes. Despite this gap in empiric evidence, the value of effective collaborative between nurses and physicians should not be underestimated. In today's healthcare arena, medical errors that carry the potential for disastrous results are too prevalent ("100K lives campaign," 2006; Institute of Medicine, 2001, 2003, 2006). Any means to decrease the incidence of such errors must be vigorously investigated. Collaboration between members of the professional care-giving dyad may provide such means and, thus, interventions that support even the slightest hope of positively influencing the process of NPC must be investigated with influential interventions adopted into clinical practice.

REFERENCES

- 100K lives campaign. (2006). Retrieved October 28, 2006, from
<http://www.ihl.org/IHI/Programs/Campaign/Campaign.htm?TabId=1>
- 2008 *Physician's desk reference*. (2007). (62nd ed.). Montvale, NJ: Thomson.
- Anthem links hospital reimbursement to performance on quality indicators. (2003).
Managed Care Outlook, 16(31), 1-9.
- Antman, E. M., Anbe, D. T., Armstrong, P. W., Bates, E. R., Green, L. A., Hand, M., et al. (2004). ACC/AHA guidelines for the management of patients with ST-elevation myocardial infarction: Executive summary. *Circulation*, 110(5), 588 - 636.
- Avillion, A. E. (2001). *Core curriculum for staff development* (2nd ed.). Pensacola, FL: National Nursing Staff Development Organization.
- Baggs, J. G. (1989). Intensive care unit use and collaboration between nurses and physicians. *Heart & Lung*, 18(4), 332 - 338.
- Baggs, J. G. (1992). Psychometric evaluation of collaboration and satisfaction about care decisions (CSACD) instrument. *Heart & Lung*, 21(3), 296-296.
- Baggs, J. G. (1994). Development of an instrument to measure collaboration and satisfaction about care decisions. *Journal of Advanced Nursing*, 20(1), 176-182.
- Baggs, J. G. (2007). Nurse-physician collaboration in intensive care units. *Critical Care Medicine*, 35(2), 641.
- Baggs, J. G., Ryan, S. A., Phelps, C. E., Richeson, J. F., & Johnson, J. E. (1992). The association between interdisciplinary collaboration and patient outcomes in a medical intensive care unit. *Heart & Lung*, 21(1), 18 - 24.

- Baggs, J. G., & Schmitt, M. H. (1988). Collaboration between nurses and physicians. *Image: Journal of Nursing Scholarship*, 20(3), 145 - 149.
- Baggs, J. G., & Schmitt, M. H. (1995). Intensive care decisions about level of aggressiveness of care. *Research in Nursing & Health*, 18(4), 345-355.
- Baggs, J. G., & Schmitt, M. H. (1997). Nurses' and resident physicians' perceptions of the process of collaboration in an MICU. *Research in Nursing & Health*, 20(1), 71 - 80.
- Baggs, J. G., Schmitt, M. H., Mushlin, A. I., Eldredge, D. H., Oakes, D., & Hutson, A. D. (1997). Nurse-physician collaboration and satisfaction with the decision-making process in three critical care units. *American Journal of Critical Care*, 6(5), 393-399.
- Baggs, J. G., Schmitt, M. H., Mushlin, A. I., Mitchell, P. H., Eldredge, D. H., Oakes, D., et al. (1999). Association between nurse-physician collaboration and patient outcomes in three intensive care units. *Critical Care Medicine*, 27(9), 1991-1998.
- Bailey, T. C., Noirot, L. A., Blickensderfer, A., Rachmiel, E., Schaiff, R., Kessels, A., et al. (2007). An intervention to improve secondary prevention of coronary heart disease. *Archives of Internal Medicine*, 167(6), 586 - 590.
- Bastable, S. B. (2008). *Nurse as educator: Principles of teaching and learning for nursing practice* (3rd ed.). Boston: Jones and Bartlett.
- Bonow, R. O., Bennett, S., Casey, D. E. J., Ganiats, T. G., Hlatky, M. A., Konstam, M. A., et al. (2005). ACC/AHA clinical performance measures for adults with chronic heart failure: A report of the American College of Cardiology/American Heart Association Task Force on Performance Measures (Writing committee to

develop heart failure clinical performance measures). *Circulation*, 112(12), 1853 - 1887.

Boyle, D. K., & Kochinda, C. (2004). Enhancing collaborative communication of nurse and physician leadership in two intensive care units. *Journal of Nursing Administration*, 34(2), 60 - 70.

Bradley, P., Oterholt, C., Herrin, J., Nordheim, L., & Bjorndal, A. (2005). Comparison of directed and self-directed learning in evidence-based medicine: A randomised controlled trial. *Medical Education*, 39(10), 1027 - 1035.

Budge, C., Carryer, J., & Wood, S. (2003). Health correlates of autonomy, control and professional relationships in the nursing work environment. *Journal of Advanced Nursing*, 42(3), 260 - 268.

Bureau of Health Professions. (2004). Preliminary findings 2004 National Sample Survey of Registered Nurses. Retrieved September 10, 2007, from <ftp://ftp.hrsa.gov/bhpr/workforce/0306rnss.pdf>

Cabana, M. D., Rand, C. S., Powe, N. R., Wu, A. W., Wilson, M. H., Abbound, P. A. C., et al. (1999). Why don't physicians follow clinical practice guidelines? A framework for improvement. *Journal of the American Medical Association*, 282(15), 1458 - 1465.

Center for Health Workforce Studies School of Public Health University at Albany. (2001). Health workforce shortages: Crisis and opportunity and potential roles. Retrieved March 2, 2008, from <http://www.haponline.org/quality/workforce/publications/gov/federal/details/bGS46XRKGLgEUIUgEWWf>

- Centers for Medicare and Medicaid Services. (2005). Medicare pay-for-performance demonstration shows significant quality of care improvement at participating hospitals. Unpublished Press Release.
- Centers for Medicare and Medicaid Services. (2006, December 14, 2006). Overview of specification of measures displayed on hospital compare - AMI and HF. Retrieved February 10, 2008, from <http://www.cms.hhs.gov/HospitalQualityInits/downloads/HospitalOverviewOfSpecs200512.pdf>
- Centers for Medicare and Medicaid Services. (2008). Roadmap for quality measurement in the traditional Medicare fee-for-service program. Retrieved February 25, 2009, from http://www.cms.hhs.gov/QualityInitiativesGenInfo/downloads/QualityMeasurementRoadmap_OEA1-16_508.pdf
- Clutter, S. L. (2007). Associations among nurse characteristics, perceived collaboration, and rates of compliance with discharge criteria for cardiac patients: A pilot study. Unpublished pilot study. West Virginia University School of Nursing, Morgantown, WV.
- Cochrane, L. J., Olson, C. A., Murray, S., Dupuis, M., Tooman, T., & Hayes, S. (2007). Gaps between knowing and doing: Understanding and assessing the barriers to optimal health care. *Journal of Continuing Education in the Health Professions*, 27(2), 94 - 102.
- Cohen, J. W. (1988). *Statistical power for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.

- Conole, G., Dyke, M., Oliver, M., & Seale, J. (2004). Mapping pedagogy and tools for effective learning design. *Computers & Education*, 43(1-2), 17 - 33.
- Curley, C., McEachern, J. E., & Speroff, T. (1998). A firm trial of interdisciplinary rounds on the inpatient medical wards: An intervention designed using continuous quality improvement. *Medical Care*, 36(8 Suppl), AS4-AS12.
- Dechario-Marino, A. E., Jordan-Marsh, M., Traiger, G., & Saulo, M. (2001). Nurse/physician collaboration: Action research and the lessons learned. *Journal of Nursing Administration*, 31(5), 223-232.
- DeFrances, C. J., & Hall, M. J. (2007). 2005 National Hospital Discharge Survey. *Advance Data from Vital and Health Statistics*, 385(July 12, 2007), 1 - 20.
- Dougherty, M. B., & Larson, E. (2005). A review of instruments measuring nurse-physician collaboration. *Journal of Nursing Administration*, 35(5), 244-253.
- The essentials of baccalaureate education for professional nursing practice*. (1998). Washington D.C.: American Association of Colleges of Nursing.
- The essentials of master's education for advanced practice nursing*. (1996). Washington, D. C.: American Association of Colleges of Nursing.
- Fonarow, G. C., Abraham, W. T., Albert, N. M., Stough, W. G., Gheorghiade, M., Greenberg, B. H., et al. (2007). Association between performance measures and clinical outcomes for patients hospitalized with heart failure. *Journal of the American Medical Association*, 297(1), 61 - 70.
- Fonarow, G. C., Yancy, C. W., & Heywood, J. T. (2005). Adherence to heart failure quality-of-care indicators in US hospitals: Analysis of the ADHERE registry. *Archives of Internal Medicine*, 165(13), 1469 - 1477.

- Glickman, S. W., Ou, F. S., DeLong, E. R., Roe, M. T., Lytle, B. L., Mulgund, J., et al. (2007). Pay for performance, quality of care, and outcomes in acute myocardial infarction. *Journal of the American Medical Association*, 297(21), 2373 - 2380.
- Harris, R. P., Helfand, M., Woolf, S. H., Lohr, K. N., Mulrow, C. D., Teursch, S. M., et al. (2001). Current methods of the U.S. Preventive Services Task Force: A review of the process. *American Journal of Preventive Medicine*, 20(supplement 3), 21 - 35.
- Havens, D. S., & Johnston, M. A. (2004). Achieving magnet hospital recognition: Chief nurse executives and magnet coordinators tell their stories. *Journal of Nursing Administration*, 34(12), 579 - 588.
- Henneman, E. A. (1995). Nurse-physician collaboration: A poststructuralist view. *Journal of Advanced Nursing*, 22(2), 359 - 363.
- Henneman, E. A., Lee, J. L., & Cohen, J. I. (1995). Collaboration: A concept analysis. *Journal of Advanced Nursing*, 21(1), 103 - 109.
- Higgins, L. W. (1999). Nurses' perceptions of collaborative nurse-physician transfer decision making as a predictor of patient outcomes in a medical intensive care unit. *Journal of Advanced Nursing*, 29(6), 1434-1443.
- Hogston, R. (1995). Nurses' perceptions of the impact of continuing professional education on the quality of nursing care. *Journal of Advanced Nursing*, 22(3), 586 - 593.
- Institute of Medicine. (2001). *Crossing the quality chasm: A new health system for the 21st century*. Washington D.C.: National Academy of Sciences.

Institute of Medicine. (2003). *Health professions education: A bridge to quality*.

Washington, D.C.: The National Academies Press.

Institute of Medicine. (2006, May 30, 2006). The chasm in quality: Selected indicators

from recent reports. Retrieved February 27, 2009, from

<http://www.iom.edu/CMS/8089/14980.aspx?printfriendly=true>

Jha, A. K., Li, Z., Orav, E. J., & Epstein, A. M. (2005). Care in U.S. hospitals: The

hospital quality alliance program. *The New England Journal of Medicine*, 353(3),

265 - 274.

Jitapunkul, S., Aksaranugraha, S., Leenawat, B., Sornthonchartwat, B., Nuchprayoon, C.,

Chaiwanichsiri, D., et al. (1995). A controlled clinical trial of multidisciplinary

team approach in the general medical wards of Chulalongkorn Hospital. *Journal*

of Medical Association in Thailand 78(11), 618 - 623.

Joint Commission on Accreditation of Healthcare Organizations. (2002). A

comprehensive review of development and testing for national implementation of

hospital core measures. Retrieved January 25, 2008, from

<http://www.jointcommission.org/NR/rdonlyres/48DFC95A-9C05-4A44->

[AB05_1769D5253014/0/AComprehensiveReviewofDevelopmentforCoreMeasure](http://www.jointcommission.org/NR/rdonlyres/48DFC95A-9C05-4A44-AB05_1769D5253014/0/AComprehensiveReviewofDevelopmentforCoreMeasure)

[s.pdf](http://www.jointcommission.org/NR/rdonlyres/48DFC95A-9C05-4A44-AB05_1769D5253014/0/AComprehensiveReviewofDevelopmentforCoreMeasure)

Knaus, W. A., Draper, E. A., Wagner, D. P., & Zimmerman, J. E. (1986). An evaluation

of outcome from intensive care in major medical centers. *Annals of Internal*

Medicine, 104(3), 410-418.

Koelling, T. M., Chen, R. S., Lubwama, R. N., L'Italien, G. J., & Eagle, K. A. (2004).

The expanding national burden of heart failure in the United States: The influence of heart failure in women *American Heart Journal*, 147(1), 74 - 78.

LaBresh, K. A., Fonarow, G. C., Smith, S. C. J., Bonow, R. O., Smaha, L. C., Tyler, P.

A., et al. (2007). Improved treatment of hospitalized coronary artery disease patients with the Get with the Guidelines program. *Critical Pathways in Cardiology*, 6(3), 98 - 105.

Larrabee, J. H., Boldreghini, S., Elder-Sorrells, K., Turner, Z. M., Wender, R. G., Hart, J.

M., et al. (2001). Evaluation of documentation before and after implementation of a nursing information system in an acute care hospital. *Computers in Nursing*, 19(2), 56-65.

Laschinger, H. K. S., & Leiter, M. P. (2006). The impact of nursing work environments

on patient safety outcomes: The mediating role of burnout/engagement. *Journal of Nursing Administration*, 36(5), 259 - 267.

Lassen, A. A., Fosbinder, D. M., Minton, S., & Robins, M. M. (1997). Nurse/physician

collaborative practice: Improving health care quality while decreasing cost. *Nursing Economic\$, 15(2)*, 87-91.

Leavitt, M. O. (2006). *Report to congress: Improving the Medicare quality improvement organization program: Response to the Institute of Medicine study*. Retrieved

January 25, 2008. from

http://www.cms.hhs.gov/QualityImprovementOrgs/downloads/QIO_Improvement_RTC_fnl.pdf.

Lenth, R. V. (2006). Java applets for power and sample size [Computer software].

Retrieved May 21, 2008, from <http://www.stat.uiowa.edu/~rlenth/Power>

Lindeke, L. L., & Siekert, A. M. (2005). Nurse-physician workplace collaboration

[Electronic Version]. *Online Journal of Issues in Nursing*, 10. Retrieved March

11, 2008 from

<http://web.ebscohost.com.www.libproxy.wvu.edu/ehost/detail?vid=20&hid=115>

&sid=be3.

Maggioni, A. P., & Latini, R. (1999). How to use ACE inhibitors, B-blockers, and newer

therapies in AML. *American Heart Journal*, 138(2, Part 2), S183 - S187.

Mark, B., Sayler, J., & Smith, C. (1996). A theoretical model for nursing systems

outcomes research. *Nursing Administration Quarterly*, 20(4), 12-27.

Mitchell, P. H., Armstrong, S., Simpson, T. F., & Lentz, M. (1989). American

Association of Critical-Care Nurses Demonstration Project: Profile of excellence

in critical care nursing. *Heart & Lung*, 18(3), 219 - 237.

Munro, B. H. (2005). *Statistical methods for healthcare research* (5th ed.). Philadelphia:

Lippincott Williams & Wilkins.

Nakanishi, M., Koyama, A., Ito, H., Kurita, H., & Higuchi, T. (2006). Nurses'

collaboration with physicians in managing medication improves patient outcome

in acute psychiatric care. *Psychiatry and Clinical Neurosciences*, 60(2), 196 -

203.

National League for Nursing Accrediting Commission. (2005). *National League for*

Nursing accreditation manual with interpretive guidelines by program type. New

York: Author.

- Needleman, J. (2001). Nursing staffing and patient outcomes in hospitals. Retrieved March 2, 2008, from <http://www.haponline.org/downloads/NurseStaffPtOutcomes.pdf>
- Nicol, E. D., Fittal, B., Roughton, M., Cleland, J. G. F., Dargie, H., & Cowie, M. R. (2008). NHS heart failure survey: A survey of acute heart failure admissions in England, Wales, and Northern Ireland. *Heart* 94(2), 172 - 177.
- O'Neil, E. H., & Commission, t. P. H. (1998). Recreating health professional practice for a new century: The fourth report of the PEW Health Professions Commission. from http://www.futurehealth.ucsf.edu/pdf_files/recreate.pdf
- Page, A. (Ed.). (2004). *Keeping patients safe: Transforming the work environment of nurses*. Washington, D. C.: National Academies Press.
- Patronis-Jones, R. A. (1994). Nurse-physician collaboration: A descriptive study. *Holistic Nursing Practice*, 8(3), 38-53.
- Polit, D. F., & Beck, C. T. (2004). *Nursing research: Principles and methods* (7th ed.). Philadelphia: Lippincott Williams & Wilkins.
- Rosamond, W., Flegal, K., Furie, K., Go, A., Greenlund, K., Haase, N., et al. (2008). Heart disease and stroke statistics - 2008 update: A report from the American Heart Association statistics committee and stroke statistics subcommittee. *Circulation*, 117, e25 - e146.
- Rosswurm, M. A., & Larrabee, J. H. (1999). A model for change to evidence-based practice. *Image: Journal of Nursing Scholarship*, 31(4), 317 - 322.
- Saha, S. A., Molnar, J., & Arora, R. R. (2007). Tissue ACE inhibitors for secondary prevention of cardiovascular disease in patients with preserved left ventricular

- function: A pooled meta-analysis of randomized placebo-controlled trials. *Journal of Cardiovascular Pharmacology and Therapeutics*, 12(3), 192 - 204.
- Smith, S. C., Allen, J., Blair, S. N., Bonow, R. O., Brass, L. M., Fonarow, G. C., et al. (2006). AHA/ACC guidelines for secondary prevention for patients with coronary and other atherosclerotic vascular disease: 2006 update: Endorsed by the National Heart, Lung, and Blood Institute. *Circulation*, 113(19), 2363 - 2372.
- SPSS. (2004). Statistical Package for Social Sciences Graduate Pack 13.0. Chicago: Author.
- Stein-Parbury, J., & Liaschenko, J. (2007). Understanding collaboration between nurses and physicians as knowledge at work. *American Journal of Critical Care*, 16(5), 470 - 477.
- Sullivan, M. (2007). *Fundamentals of statistics* (2nd ed.). Upper Saddle River, NJ: Prentice Hall.
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5 ed.). Boston: Allyn and Bacon.
- United States Department of Health and Human Services Health Resources and Services Administration. (2002). *Projected supply, demand, and shortages of registered nurses: 2000 - 2020*. Retrieved March 2, 2008. from <http://www.haponline.org/downloads/HRSANurses2000-2020.pdf>.
- United States Department of Health and Human Services Health Resources and Services Administration. (2006). *The Registered Nurse population: Findings from the March 2004 National Sample Survey of Registered Nurses*. Retrieved November 12, 2007. from <ftp://ftp.hrsa.gov/bhpr/workforce/0306rnss.pdf>.

- United States Preventive Services Task Force. (1989). Appendix A: Task force ratings. In M. Fisher (Ed.), *Guide to clinical preventive services: An assessment of effectiveness of 169 interventions*. Baltimore: Williams & Wilkins.
- Weiss, S. J., & Davis, H. P. (1985). Validity and reliability of collaborative practice scales. *Nursing Research*, 34(5), 299 - 305.
- Wilson, B. A., Shannon, M. T., Shields, K. M., & Stang, C. L. (2007). *Nurses' drug guide 2007*. Upper Saddle River, NJ: Pearson Prentice Hall.
- Yan, A. T., Yan, R. T., Tan, M., Huynh, T., Soghrati, K., Brunner, L. J., et al. (2007). Optimal medical therapy at discharge in patients with acute coronary syndromes: Temporal changes, characteristics, and 1-year outcomes. *American Heart Journal*, 154(6), 1108 - 1115.
- Zangaro, G. A., & Soeken, K. L. (2007). A meta-analysis of studies of nurses' job satisfaction. *Research in Nursing & Health*, 30(4), 445 - 458.

APPENDIX A
Demographics – Nurses
 Monongalia General Hospital

CERNER Code _____ Did you participate in the pilot study in 2007? Yes No

1. **Age** _____ (confidential information)
2. **Gender:** _____ Male (1)
 _____ Female (2)
3. **Race and/or ethnic origin:**
 _____ American Indian or Alaskan Native (1)
 _____ Asian or Pacific Islander (2)
 _____ Black, not of Hispanic origin (3)
 _____ Hispanic (4)
 _____ White, not of Hispanic origin (5)
 _____ Other (6) _____
4. **Unit:**
 _____ SSD (1)
 _____ MSD (2)
 _____ ICU (3)
 _____ CCU (4)
6. **Position:**
 _____ Admission/discharge
 _____ RN (1)
 _____ Staff nurse (2)
 _____ Clinical manager (3)
 _____ Clinical educator (4)
5. **Work Status**
 _____ Permanent assignment (1)
 _____ Per-diem (2)
 _____ Critical care float pool (3)
7. **Year of Graduation from INITIAL nursing education**
 _____ Year of Graduation
8. **Type of INITIAL Nursing Education:**
 _____ LPN/LVN (1)
 _____ RN – Diploma (2)
 _____ RN – ADN (3)
 _____ RN – BSN (4)
9. **Highest nursing degree completed**
 _____ Diploma (1)
 _____ Associate Degree (2)
 _____ Baccalaureate Degree (3)
 _____ Masters Degree (4)
 _____ Doctoral Degree (5)
10. Presently **enrolled** in an educational program? _____ Yes (1) _____ No (2)
 If yes, degree sought _____
11. Number of years as a **registered nurse** _____
12. Number of years **at Mon General Hospital** _____
13. Number of years worked in **ANY** critical care unit _____
14. Number of years worked in **THIS** critical care unit _____
15. Do you have a CCRN or med-surg certification ? _____ Yes (1) _____ No (2)

APPENDIX B

Knowledge Test

CERNER ID _____

Knowledge test for Collaboration: Your Contributions are VITAL to Better Patient Outcomes!

1. Which of the following are contraindication(s) to ACEI/ARB therapy? (check all that apply)
 - _____ Age > 80 years
 - _____ Allergy to ACEI/ARB
 - _____ Angioedema
 - _____ Cardiogenic shock
 - _____ Cough
 - _____ Creatinine of 2.4
 - _____ Ejection Fraction of 34%

2. The following are discharge criteria for acute MI patients, heart failure patients, or both. Label each criterion as AMI, HF, or B
 - _____ ACEI/ARB
 - _____ Aspirin
 - _____ Assessment of left ventricular systolic function
 - _____ Beta-blocker
 - _____ Complete discharge instructions
 - _____ Smoking cessation counseling

3. List three conditions that MUST be met BEFORE collaboration can occur

4. List three essential components of collaboration

5. Why is it VITAL that you collaborate with your patient's doctor(s)? (check all that apply)
- ☐ You know the best treatments for the patient
 - ☐ You know the patient's progress with the plan of care of multiple disciplines
 - ☐ You know unique things about your patient that the doctor may not know
6. What are the benefits of collaboration between nurses and doctors? (check all that apply)
- ☐ Better care for the patient
 - ☐ Improved social status for the nurse with RN colleagues
 - ☐ Improved social status for the nurse with physician colleagues
 - ☐ Nurses are generally more satisfied with their work when they and physicians collaborate

APPENDIX C

Collaboration Questionnaire

Relationship of Perceived Nurse-Physician Collaboration To Patient Outcomes Measures

Collaboration and Satisfaction about Care Decisions (CSACD)

Face Sheet

Your provider number _____

FIN number of this discharge episode _____

Appendix D

Chart Review Form

# RN / # eligible episode	Collect Date / Time	CERNER #	FIN #	LOS	Discharge Diagnoses	LVSF & How Assessed	ACE/ARB Contraindication – What?	ACE ARB	Beta Blocker	ASA	Smkg Cess	D/C Instrct
					1 = ACS 2 = AMI 3 = CAD 4 = HF	Value _____ 1 = Echo 2 = C. Cath 3 =- EST 4 = Other _____ 5 = Not assessed	1 = none 2 = allergy 3 = creat > 2.5 (M) or 2.0 (F) 3 = K > 5.0 4 = brady or SSS 5 = C. shock 6 = HF or RVF 2 ⁰ PHTN 7 = Other	Y (1) N (0) NA (0)	Y (1) N (0)	Y (1) N (0)	Y (1) N (0) NS (0)	Y (1) N (0)

D/C instructions include: Activity level; Diet and fluid intake; Discharge medications; Follow-up appointment; Weight monitoring; What to do if symptoms worsen

APPENDIX E

Educational intervention

Participant identifier (CERNER sign-on) _____

Our feature attraction is:

Collaboration: **Your**
Contributions Are **VITAL**
To Better Patient Outcomes!

Written for use at Monongalia General Hospital

Author: Sara L. Clutter, PhD (c), RN
Doctoral Candidate
West Virginia University School of Nursing
July 15, 2008

Welcome to this educational session! As you may know, my research area of interest is collaboration between nurses and physicians. I am also interested in the relationship of that collaboration to outcomes for our patients. As such, this educational session is part 1 of my dissertation study. I greatly appreciate your participation.

I know that your time is valuable ... so ... at the end of this module ... I will tell you how you can get a **\$20.00 gift card** as my way of saying THANKS for completing all parts of my research study!

In order to complete this self-learning packet, you need to:

- (1) Read this module
- (2) Complete the self-study questions within the module
- (3) Complete the post-test after you read the module
- (4) Enter your CERNER sign-on code for BOTH the module and post-test (**DO NOT** enter your name on either of these documents!)
- (5) Return BOTH the module and the post-test to my mailbox on your clinical nursing unit.

This self-learning packet will take most RNs approximately 35 minutes to complete. It is divided into 5 sections. These sections will require 3 – 12 minutes each to complete. You do not need to complete all sections in one sitting. In fact, you can do each section at a different time.

Objectives:

Upon completion of this self-learning package, the nurse learner will be able to:

1. Describe the significance of cardiac disease in the United States
2. Identify discharge therapies appropriate for major cardiovascular disorders
3. Define nurse-physician collaboration
4. Describe the essential components of nurse-physician collaboration
5. Identify one thing you personally could do to improve collaboration between you and a physician

As you progress through this self-learning packet, it is important for you to make notes in the margins and note any questions you may have.

Please e-mail your questions to slutter@waynesburg.edu. If you prefer, questions may be called to me directly at 724-627-9202. Anonymous messages may be left on the answering machine. I will reply to all questions via the study's link on the intranet.

Sections 1 - Significance of Cardiac Disease in the United States

Heart disease is the leading cause of illness and death for **BOTH** men and women in the United States (Rosamond et al., 2008, p. e51). As a matter of fact, cardiovascular disorders caused health concerns for 80.7 million adults and were the leading cause of discharge from acute care hospitals in 2005, totaling \$4.2 million (DeFrances & Hall, 2007, p. 3; Rosamond et al., 2008, p. e36)! Collectively, cardiovascular disorders cause 1 death every 37 seconds **each day** in the United States (Rosamond et al., p. e32), and will account for a projected national cost of \$448.5 billion in 2008 (Rosamond et al., p. e36).

This is a **SIGNIFICANT** amount of human and financial cost for one set of health disorders!

So, how do Mon General's numbers compare with the national statistics? Last year at Mon General, cardiovascular disorders accounted for 11,050 patient care days and **29.5%** of all discharges. The combination of acute myocardial infarction (AMI) and heart failure (HF) accounted for nearly 17% of those patient care days and slightly more than 14% of those discharges. In addition, AMI and HF accounted for nearly \$5 million of Mon General's billable services in 2007 (J. Ritchie, personal communication, May 5, 2008). These figures represent a **substantial** amount of Mon General's patient base! Anything we can do to improve the outcomes of care for this quantity of patients would be a HUGE contribution to the health and well being of our community!

That's where we come in!

Since the costs of cardiovascular disorders are so great, it is vitally important that we, as registered nurses, do everything we can to ensure that cardiac patients get the best care medical and nursing sciences have to offer!

As one of the RNs providing care to AMI and HF patients at Monongalia General Hospital, you hold a **very influential** position for improving outcomes of care. Several medical and healthcare organizations believe that certain treatments help keep these patients healthier following discharge from acute care.

For AMI and HF patients, expected treatments at discharge have been defined by the Centers for Medicare and Medicaid Services (CMS) and represent the best practices medical and nursing sciences have to offer. These treatments are based on evidence from the National Institutes of Health as well as other scientific research (Antman et al., 2004; Bonow et al., 2005; Center for Medicare and Medicaid Services, 2006). The American Heart Association, the American College of Cardiology, and the Joint Commission also support these treatments.

The next section will review the discharge criteria recommended for AMI and HF patients.

Section 2 –Discharge Criteria for AMI and HF Patients

The Centers for Medicare and Medicaid Services, the American Heart Association, the American College of Cardiology, and the Joint Commission all agree that certain therapies help AMI and HF patients to recover more quickly, enjoy healthier more productive lives, and have fewer complications (Bonow et al., 2005; Center for Medicare and Medicaid Services, 2006; Fonarow et al., 2007; Leavitt, 2006; Yan et al., 2007). These therapies, identified and defined as criteria to be met upon discharge, comprise the discharge indicators of care quality for AMI and HF patients. Compliance with these indicators not only ensures that we are providing the best scientific care to our cardiac patients but ... our compliance with them also influences our reimbursement rates from insurance companies for these diagnoses!

Acute Myocardial Infarction

The therapies that should be ordered upon discharge for AMI patients are:

- (1) Aspirin
- (2) Beta blocking agent
- (3) Assessment of left ventricular systolic function (LVSF)
- (4) Angiotensin converting enzyme inhibitor (ACEI) or angiotensin receptor blocker (ARB) if LVSF is less than 40%
- (5) Smoking cessation counseling and education for all patients who have smoked within the past 12 months (Center for Medicare and Medicaid Services, 2006).

These criteria mean that, unless a clear contraindication exists, **ALL** AMI patients should be discharged with prescriptions for aspirin and a beta-blocker. In addition, all AMI patients with less than 40% ejection fraction should be discharged with a prescription for an ACEI/ARB.

Smoking cessation counseling and education should also be provided for **ALL** AMI patients who have smoked within the previous **12 months**. This counseling and education should be documented somewhere during the course of their stay, not just on the discharge instruction sheet. Additionally, to meet the Joint Commission's criteria for smoking cessation and counseling, a prescription for a cessation aid must be included.

Contraindications ...

You might be wondering what constitutes contraindications to these recommended therapies ...

The answer to that question is not clear-cut! Prescribing references and medication guides list a variety of contraindications, precautions, and warnings about these medications (*2008 Physician's desk reference*, 2007, p. 2068; Wilson, Shannon, Shields, & Stang, 2007).

In addition, many physicians and nurses believe that age greater than 65 years, hypotension, hyperkalemia, or renal disease are acceptable reasons to withhold these suggested therapies. **NOT TRUE**, according to the research evidence (*2008 Physician's desk reference*, 2007; Antman et al., 2004; Fonarow et al., 2005; Smith et al., 2006)!

Independent scientific research, not presented by drug companies, notes the following contraindications to **beta-blockers** (Maggioni & Latini, 1999):

- Allergy
- Severe bradycardia
- Sick sinus syndrome or heart block greater than 1st degree (without a functioning pacemaker)
- Cardiogenic shock

- Decompensated heart failure
- Right ventricular failure secondary to pulmonary hypertension
(Maggioni & Latini, 1999, p. S184)

Independent scientific support also addresses **ACEI/ARBs**. According to the American College of Cardiology and the American Heart Association Task Force on Performance Measures, the only ***absolute*** contraindications for ACEI/ARB are allergy and moderate to severe aortic stenosis (Bonow et al., 2005; Fonarow et al., 2005).

In addition, scientific evidence supports positive outcomes from **ACEI/ARB** therapy, even in elderly patients with hypotension, hyperkalemia, and moderate renal disease. One scientific study investigated the effect of ACEI/ARB therapy on elderly patients suffering from hypotension, hyperkalemia, or renal disease compared with ACEI/ARB therapy on elderly patients without those diseases.

The results indicated a **16% decrease** in 1-year mortality rates for the sicker patients over those without any presumed complications (Antman et al., 2004, p. 1663)!

This means that the sickest elderly patients benefited from ACEI/ARB therapy **EVEN MORE** than the healthier elderly patients.

Since scientific research, the American Heart Association, the American College of Cardiology, and other accreditation agencies support the use of ACEI/ARB therapy, the physician, CRNP, or PA must make an entry in the medical record indicating the reason an ACEI/ARB was not prescribed.

What do these scientific results mean for you, the RN?

They mean, as a patient advocate, you have the responsibility to represent the best interest of the patient when collaborating with the physician about care decisions... you have the responsibility to share your knowledge of these findings with physicians.

Assessment of LVSF ...

As for the assessment of LVSF (measurement of ejection fraction) ... AMI patients might have this value assessed before, during, or after their hospital stay. This assessment may be obtained via echocardiogram, exercise stress test, or cardiac catheterization (Fonarow et al., 2005).

Keep going ... you are doing a GREAT job!

Heart Failure

Discharge indicators of care quality for HF are:

- (1) Assessment of left ventricular systolic function (LVSF)
- (2) ACEI or ARB if LVSF is 40% or less (Fonarow et al., 2007, p. 63)
- (3) Smoking cessation counseling and education for all patients who have smoked within the past 12 months
- (4) Provision of “written discharge instructions or educational material to include all of the following:
 - Activity level
 - Diet and fluid intake
 - Discharge medications
 - Follow-up appointment
 - Weight monitoring
 - What to do if symptoms worsen” (Bonow et al., 2005, p. 1859; Center for Medicare and Medicaid Services, 2006; Fonarow et al., 2005)

Evidence Base

The evidence for both the AMI and HF indicators has been gathered over time from several randomized clinical trials (RCTs). As you may know, RCTs are the most scientifically sound research studies designed. They adhere to the most rigorous research methods and have the most consistent levels of control over extra variables that might otherwise influence the results of the study. Thus, evidence generated from RCTs is widely accepted to be valid scientific results upon which to base decisions about patient care (Polit & Beck, 2004).

Several RCTs have been conducted over more than 20 years that have contributed to the discharge criteria now promoted by the CMS, the American Heart Association, the American College of Cardiology, the Joint Commission, and other clinical and accrediting bodies. Some of the best-known trials are:

- International Study of Infarct Survival (ISIS trials)
- Studies of Left Ventricular Dysfunction Study (SOLVD)
- Acute Decompensated Heart Failure National Registry (ADHERE)
- and other less well known RCTs (Saha, Molnar, & Arora, 2007).

Despite more than 20 years of **consistent** scientific evidence to support the positive outcomes of the recommended therapies, actual compliance with these criteria range from 35 – 89% depending on the criterion and the diagnosis (Fonarow et al., 2007; Fonarow et al., 2005; Jha et al., 2005; LaBresh et al., 2007; Nicol et al., 2008)!

This means that although we KNOW what therapies provide the best possible outcomes for our cardiac patients, we are still not providing those therapies for a large volume of our patients!

What if you were a cardiac patient ... wouldn't you want the best possible therapies based on scientific evidence???

That brings me to my **research question...**

Is collaboration between nurses and physicians related to compliance with the discharge criteria for AMI and HF patients?

I think the answer is YES! ... As one of the primary caregivers for patients, YOU – the nurse – have a crucial role in ensuring that appropriate discharge criteria are met!

Now that we have covered what constitutes “appropriate discharge criteria” for AMI and HF patients, let’s examine how YOUR ROLE in collaboration might help ensure compliance with those criteria.

Section 3 – Definition of Nurse-Physician Collaboration

As noted in the previous section, compliance with specific discharge criteria for AMI and HF patients, as defined by the CMS, is associated with improvements in clinical outcomes for our patients (Fonarow et al., 2007). So ... how do we, as nurses, contribute to these improvements for our patients? ... Through collaboration!

Collaboration between nurses and physicians provides the important process by which these discharge criteria might be met. It is a vital part of our work as nurses if our patients are to achieve the best possible outcomes. Collaboration is more than just communicating! It is a process that provides for shared decision-making that includes your knowledge and expertise as a nurse.

As a nurse, you spend more time with the patient and his/her family each day than the physician. Because of this extra time at the bedside, you know more about the patient's concerns, acceptance of, and responses to treatment than any other member of the healthcare team. Also, since you personally interact with other healthcare professionals (social service, PT, OT, speech, case management, respiratory therapy, spiritual services, etc.) you are the **ONE** member of the healthcare team who knows the goals, progress, and concerns of all other disciplines. That makes **YOU**, the registered professional nurse, the “keeper” of vital information that the physician needs to plan the best medical care for the patient!

During patient interactions, the physician brings knowledge and expertise of medical diagnoses. He/she is responsible for monitoring the patient's progress with all instituted healthcare therapies and for issuing prescriptions for additional therapies to promote recovery from illness or progression to a peaceful death.

You, the RN, bring the knowledge and expertise of nursing! What concerns does the patient have about his diagnosis? How will the patient attend to ADLs after discharge? What fears does the patient have about going home? Are there significant family dynamics that may interfere with a safe recovery?

As the nurse, your area of expertise is **holistic care**. You are the expert in “putting together all of the pieces of the puzzle” that represent your patient!

As you can see, each of the primary professional members of the healthcare team, the RN and the physician, has **unique knowledge** about the patient, his illness, and his recovery. Both RN and physician must **share** their unique information with each other if the patient is to experience the **best** possible outcomes.

The process of ***collaboration*** is the most efficient way for this exchange of vital information to occur.

Collaboration involves working together as a team, focusing on the patient, and sharing unique information (Baggs & Schmitt, 1997).

Almost done ... keep going!

Section 4 – Essential Components of Collaboration Between Nurses and Physicians

*The patient is always the focus of collaboration between nurses
and physicians* (Lindeke & Siekert, 2005).

As you already know, the information that you, the RN, know about your patient and his/her family is different from the information that the physician knows. A nurse is available to the patient 24 hours a day/ 7 days a week.

In order for collaboration to happen, the key players (nurses and physicians, in this case) must be both **available** and **receptive** (Baggs & Schmitt, 1997).

Being available means that you take the **time** to contribute your unique **knowledge** to the collaborative exchange. The **places** in which this occurs include the nurses' station, patient's room, via telephone discussion, or even over the Internet.

Being receptive means that you are **interested** in the collaborative **discussion** and that you share **trust** and **respect** with the person with whom you are collaborating (Baggs & Schmitt, 1997).

In order for collaboration to really happen, you need to demonstrate your knowledge, creativity, and integrity (Lindeke & Siekert, 2005).

When these essential components of collaboration: **time, knowledge, interest, discussion, trust, and respect** are present, the interaction between you and the physician are working as a team, sharing responsibility for the patient, and focusing on the patient ... you are collaborating! This sharing and focusing on the patient translates into better care, more attention to individual patient needs and wishes, and better health outcomes.

For our cardiac patients, collaboration and its essential components provide the best opportunity for all of the expected discharge therapies to be prescribed. According to scientific evidence, the more of these expected discharge therapies that are met, the better the health outcomes are for the patient!

If true collaboration occurs, both you and the patient get rewarded! The patient receives **better care and has better outcomes** while you gain **social status** with the physicians and your fellow nurses. Finally, when true collaboration happens and patient outcomes are better, **you feel better about the job you did** (Stein-Parbury & Liaschenko, 2007)!

Interactive Exercise

Please read this scenario then answer the questions that follow. Write your answers **directly on this packet**. For this scenario, assume you are the dayshift nurse-working 7 AM – 7 PM.

Mr. S., a 72-year old male patient, was admitted from home 2 days ago with epigastric pain, chest heaviness, and shortness of breath. Mr. S. is a current cigarette smoker with a 93-pack/year history. Current labs/diagnostic results are as follows: (where a range is given, that range denotes values from admission until peak):

Rhythm strip – NSR, rate 62

CXR – normal

EKG – Acute inferior wall MI

Labs: Random Glucose – 85 mg/dL

BUN – 22 mg/dL

Creatinine – 2.2 mg/dL

Na⁺ - 140 mEq/L

K⁺ - 4.0 mEq/L

Labs: Cl⁻ - 100 mEq/L

CO₂ – 25 mmol/L

Total protein – 6.1 g/dL

Albumin – 3.4 g/dL

CK range – 72 – 850 U/L

Troponin range – 0.04 – 1.37 µg/L

Urinalysis - unremarkable

Mr. S. was treated in the ED with 3L oxygen via nasal cannula, aspirin 81 mg po, and ntg 0.4 mg sl. He has been pain free ever since. He had a cardiac catheterization, echocardiogram, and various lab tests during this admission. Mr. S. has ambulated in the hallway without chest pain and is “ready to go home”. He lives with his 69-year-old wife in a townhouse in Morgantown. The attending physician rounded during AM shift report, so you did not get the opportunity to discuss this case. After report, you find written progress notes and orders as follows:

Progress note: No further pain since admission. EF = 35% via cardiac cath. Successful angioplasty of RCA with placement of 2 stents. Labs/dx tests indicate Acute inferior wall MI.

Orders: Discharge to home with the following medications/orders: ASA 81 mg po qd, Lopressor 25 mg po qd, STOP SMOKING, activity as tolerated, follow-up with cardiology in 3 weeks.

On your first rounds, Mr. S. states “I’m really glad to be going home but, boy, is my doctor mad at me for smoking ... Trouble is ... I’ve been smoking since I was 10-years-old and ... I don’t know if I can just quit... cold-turkey! ...I’ve tried before ... but ...I’ve never made it.

1. *Are there any CMS discharge indicators for AMI patients that Mr. S's case does not meet? If yes, which ones?*

2. *Describe how you will meet the preceding conditions of collaboration for this scenario:*

Your availability (time, place, and unique knowledge)

Being receptive to this collaboration (interest, discussion, trust, respect)

You call the physician. When you try to collaborate with him/her about your concerns for Mr. S's, the physician replies that Mr. S. is "too old to have an ACE inhibitor prescribed, besides, his creatinine is 2.2! ... He's in renal failure and can't have an ACE inhibitor. Regarding the smoking deterrent, he should not be smoking in the first place ... I've been telling that for years! ... He just needs to STOP altogether ... I am NOT going to make this easy for him!"

3. *What strategies might you use to improve the collaborative exchange between you and the physician so that Mr. S. receives the appropriate care outlined for AMI patients?*

4. *What benefits will Mr. S. receive from improved collaboration between you and the physician?*

Section 5 - Reflective Learning Exercise

The purpose of this exercise is for you to discover some practical ways to improve collaboration between you and a physician.

(1) Think about a recently assigned patient who did **not** have the outcome you expected.

(2) Briefly describe the interaction between you and the physician about this patient.

(3) How much collaboration would you say really occurred during this interaction?

None

Minimal

Some

Lots

(4) Which critical attributes of collaboration were missing or weak (circle all that apply)?

Knowledge

Interest

Trust

Time

Discussion

Respect

(5) Describe one thing that you could have done differently to improve the collaboration between you and the physician in this case?

Here are a few suggestions to help you collaborate better ...

1. **Improve your skills for professional communication** –these skills include, confidence, assertiveness, listening, respect, professional courtesy, and knowledge.
2. **Link your observations and assessments with your concerns about the health outcomes of your patients** ... “connect the dots” so others do not have to *guess* at your logic or meaning.
3. **Be assertive - NOT AGGRESSIVE!** Being assertive means you clearly communicate your professional nursing assessments, observations, and conclusions. Don’t be shy! You have spent a lot of time with this patient and his/her family. They have shared their fears, concerns, and confidences with you. Discuss **YOUR** patient’s needs with the physician as a **professional colleague**.
4. **Time your contacts with the physician** – Discuss your patient assessments, observations, and conclusions with the physician BEFORE he/she examines the patient. This will allow the physician to address these patient care items during rounds and avert the need for you to page the physician later to address them. One great way to do this is to round with the physician. If you don’t have time to round, try to discuss your nursing contributions with the physician at the nurses’ station BEFORE he/she begins rounds.

I’m sure you and your peers have thought of others – I will compile a list of everyone’s ideas and distribute them once all have completed this learning packet!

Congratulations ... you did it! ... You are almost finished with this educational packet on collaboration!

The final step is to complete the **post-test** on the following page. Once you have finished, please place this module in the mailbox that is assigned for *Sara Clutter*. The mailbox is in the same place as staff mailboxes on your nursing unit.

The next step in this research study is for you to complete a collaboration survey **each and every time** you discharge a patient! The collaboration surveys will be attached to the discharge documents you get from the ACC. Please return completed surveys to the labeled “black box” located at the nearest nurses’ station.

I realize your time is valuable so ... once all data have been collected for my study, I will provide an appreciation gift card worth \$20.00 for each participant who has completed **BOTH** a posttest and a collaboration survey on an eligible discharge episode (AMI or HF patient)! This cash gift is my way of saying *thanks* for helping me with my research study!

How will you get your \$20.00 gift card??? ... Well ... since your identity is protected, I will leave all cash gifts with Scott Brode, the CERNER security officer. His office is located across the hall from the Pharmacy on the Lower Level. Your cash gift will be in an envelope addressed to your CERNER sign-on code. I will post a note by the time clock when you can pick-up your cash gift.

*Thanks ... I really appreciate your participation
in my dissertation study!*

Please remember to **sign-in** on the registration roster if you want credit through the Education Department for completing this in-service session.

Curriculum Vitae

Sara L. Clutter

293 Dillie Road

Sycamore, PA 15364-8506

724- 627-9202 (home)

724-852-3236 (office)

Business Address:

Waynesburg University

Nursing Department

51 W. College Street

Waynesburg, PA 15370

Licensure:

Currently licensed as a Registered Nurse in Pennsylvania

Currently licensed as a Registered Nurse in West Virginia

Education:

West Virginia University

School of Nursing

Morgantown, WV 26506

Doctor of Philosophy – Nursing

Defense of dissertation April 6, 2009

Anticipated graduation May 16, 2009

Duquesne University

Pittsburgh, PA 15282

Master of Science in Nursing -1997

Waynesburg College

Waynesburg PA 15370

Bachelor of Science in Nursing - 1991

Valedictorian

The Washington Hospital School of Nursing

Washington, PA 15301

Diploma - 1981

**Statement of
Philosophy:**

As a nurse educator, I believe that today's nurses must be able to care for and relate to individuals from all over the world. As such, today's nursing students must be taught how to integrate the Christian mission of faith, love, and service to mankind with the abilities to recognize spiritual needs and foster spiritual comforts of patients with a wide range of spiritual beliefs. All of this must be accomplished without compromising the values of the Christian institute of higher education. Furthermore, it is my philosophy that both clinical and classroom education of nursing students must get

“back to the basics.” A solid background in physiology and pathophysiology, excellent communication skills, adherence to the ‘golden rule’, and the day – to – day implementation of creative thinking, decision-making, and problem-solving using critical thinking are the keys to revitalization of the nursing profession. In addition, nursing students must be taught to incorporate faith, service, caring, and life-long learning into their professional demeanor. It has been said that “nursing personifies the art of caring.” In order for this to once again become reality, nursing students must be instructed in not only the importance of caring but also the implementation of caring in various practice arenas. Nurses have been the mainstay of patient care for decades. The commitment of nursing faculty to restore this image must not be underestimated.

Professional Experience:

August 2003 – present – Assistant Professor of Nursing, Waynesburg University, Main Campus, Full-Time Position: Responsible for teaching Leadership/Management, Nursing Research, Evidence-Based Practice, Critical Care Labs, Critical Thinking, Fundamentals of Nursing, and Life Skills – CPR.

2003 – 2007 – Instructor, Waynesburg University, RN – BSN Program, Part-Time Position: Responsible for teaching Issues in Health Promotion and Transitions to Nursing.

2002 – present – Facilitator, Waynesburg University, Program of Graduate Studies, Part Time Position: Responsible for facilitating Clinical Teaching Strategies, Principles of Patient Education, Nursing Education Practicum, and Seminar on Student Problems. Responsibilities also include mentoring independent study projects with graduate nursing students.

2007 – present – House supervisor, Monongalia General Hospital. Per Diem Position: Responsible for administrative and management duties for the entire organization, focusing on patient flow, staffing, coordination of services and personnel, and customer service recovery.

2008 – present – Chart review consultant, Monongalia General Hospital Family Birth Center. Per Diem Position: Responsible for reviewing prenatal, intrapartum, and immediate post-partum medical records for quality improvement opportunities.

2002 – 2003 –Faculty, Waynesburg College, Undergraduate Program. Part-Time Position: Responsible for instruction of sophomore level nursing students in the campus learning lab and

for assessment and validation of clinical skills related to foundations of nursing. Also responsible for teaching selected lecture content in Pathophysiology and Fundamentals of Nursing. .

2000 – 2005 - Education Consultant, Greene County Memorial Hospital Individual Consultation Basis only: Responsible for planning and developing curricula, delivering content, and evaluating learning/competence related to selected topics. Also active as a clinical mentor for Medical-Surgical and Special Care Unit staff, focusing on development of time management, prioritization, and clinical and leadership skills.

1999 - 2005 – Supervisor, Nursing Administration, Greene County Memorial Hospital. Casual Position: Responsible for administrative and management duties for the entire organization during off tours of duty, especially staffing, coordination of services and personnel, and customer service recovery.

1997 - 2003 - Education Specialist, Education Department, The Washington Hospital Full Time Position: Responsible for educational needs of all hospital employees. This includes planning, coordinating, implementing, and evaluating educational programs, which address regulatory and accrediting requirements, professional practice acts, organizational goals, quality improvement initiatives, risk management issues, and individual requests by management or staff personnel. Other major responsibilities include project management and coordination for assigned areas and participation as a coordinator or integral member of numerous organizational and departmental projects and process improvement teams.

1993 - 1997 - Staff Development Instructor, The Washington Hospital Full Time Position: Responsible for educational needs of select clinical areas including Intravenous Therapy, Oncology, Radiation Therapy, Outpatient Services, Ambulatory Care, Pediatrics, and Endoscopy. Also coordinated and/or presented several aspects of orientation and training as well as critical care education, including ACLS, arrhythmia, and critical care classes.

1990 – 1993 – Assistant Nurse Manager, Cardiac Intermediate Care Unit, The Washington Hospital Full Time Position: Responsible for management duties regarding personnel and day-to-day operation of a critical care, step-down unit.

1989 - 1990 - Administrative Nursing Supervisor, The Washington Hospital Full Time Position: Responsible for administrative and

management duties for the entire organization during off tours of duty.

1986 - 1989 - Staff Nurse, Coronary Intensive Care Unit, The Washington Hospital Full Time Position: Responsible for assessing, planning, implementing, and evaluating care of critically ill patients/significant others with both medical and surgical admission diagnoses.

1981 - 1986 - Staff Nurse, Intermediate Care Unit, The Washington Hospital Full Time Position: Responsible for assessing, planning, implementing, and evaluating care of seriously/critically ill patients in need of cardiac monitoring.

System trainer for the Medical Information System at The Washington Hospital Full Time, Temporary Position held for two separate 6-month tours during implementation of different phases of documentation/result reporting: Responsible for training system users on new upgrades to computerized patient record system.

Honors:

2009 – Nominated for Sigma Theta Tau Rising Star Award – West Virginia University School of Nursing

1997 - Graduated with 4.0 grade point average from Duquesne University (MSN)

1993 - Sigma Theta Tau - Duquesne University, Pittsburgh, PA 15282

1991 - Graduated with 4.0 grade point average from Waynesburg College (BSN)

Certification:

1989 - 1995 -- AACN Certification Corporation - CCRN

Scholarly Activities:

Publications:

Campsey, J., Clutter, S., Hotz, M., Jennings, K., & Zaremba, J. (1994). *Staff development survey shapes restructure*. Trendlines, 5(4), p. 4 -65.

Husted, G., Miller, C., Zaremba, J., Jennings, K., Clutter, S., & Stainbrook, D. (1997). *What well elderly persons want to know about advance directives and what attracts them to particular brochures*. Journal of Gerontological Nursing, 23 (12), p. 41-45.

Lecture/Paper Presentations:

Doctoral Student Milestones – Southern Nursing Research Society Annual Conference; Baltimore, MD; February 2009

Moving from “Group Thinking” to “Critical Thinking” – What’s in it for you? – West Virginia University Hospitals Nursing Symposium, Morgantown, West Virginia, April 2008

Encouraging Evidence Based Practice – Drexel University’s Nursing Education Institute, Miami, Florida, June 2007.

Academic Dishonesty and Nursing Students - Drexel University’s Nursing Education Institute, Miami, Florida, Scheduled for June 2007.

Improving Critical Thinking Among Nursing Students – Drexel University’s Nursing Education Institute; Providence, Rhode Island, June, 2006.

Using Old Tricks to Teach New Dogs ... The Renewed Value of the Question “Why?” – Drexel University’s Nursing Education Institute; Providence, Rhode Island, June, 2006.

Collaboration: State of the Science Review (concept paper) – Sigma Theta Tau International, Alpha Rho Chapter Research Day and Induction, Morgantown, West Virginia, October 2005.

PowerPoint 101 – Waynesburg College Convocation Week, August 2004.

Portable Learning: The Self-Directed Method - Healthcare Management Staff Development and Education, The Ohio State University Medical Center, Columbus, Ohio, October 1998.

Creative Teaching - Three Rivers Chapter Association of Professionals in Infection Control, Pittsburgh, Pennsylvania, August 1996.

Self-Directed Learning: The Untapped Resource - Staff Development and Clinical Education: Shaping the Future of Nursing Practice, Columbus, Ohio, October 1995.

Poster Presentations:

The Effects of an Educational Intervention on Nurse-Physician Collaboration and Compliance Rates with Quality Indicators for Cardiac Patients in Critical Care Settings – Invited guest of West

Virginia School of Dentistry, West Virginia University,
Morgantown, West Virginia, February 2009.

*Associations among Nurse Characteristics, Perceived
Collaboration, and Rates of Compliance with Quality Indicators
for Cardiac Patients: A Pilot Study* – VanLiere Research
Convocation, West Virginia University, Morgantown, West
Virginia, April 2008

*Associations among Nurse Characteristics, Perceived
Collaboration, and Rates of Compliance with Quality Indicators
for Cardiac Patients: A Pilot Study* - Southern Nursing Research
Society Conference, Birmingham, Alabama, February 2008

*Number of Provider Types and Outcomes of Diabetes:
A Secondary Data Analysis* – Southern Nursing Research Society
Conference, Galveston, Texas, February 2007.

*Integrative Review: Effect of Nurse-Physician Collaboration on
Patient Outcomes* – Southern Nursing Research Society
Conference, Atlanta Georgia, February 2005 (regional) and Sigma
Theta Tau International, Alpha Rho Chapter Research Day and
Induction, Morgantown, West Virginia, October 2005 (local).
Maintaining Staff Competence with Intravenous Therapy -
Healthcare Management Staff Development and Education, The
Ohio State University Medical Center, Columbus, Ohio, October
1998.

*Educating Staff Nurses About the Use and Care of Midline and
Peripherally Inserted Central Catheters* - Healthcare Management
Staff Development and Education, The Ohio State University
Medical Center, Columbus, Ohio, October, 1998.

Take Your Show on the Road...Ole! - Nursing Staff
Development Conference, Orlando, Florida, February 1995.

Portable Learning: The Self-Directed Method - Nursing Staff
Development Conference, Orlando, Florida, February 1995.

Book Reviews:

Nursing Leadership and Management (2nd ed.). (in manuscript
form). Thomson Delmar.

NCLEX-RN Mastery: Q & A Review with an Evidence-Base –
reviewed book proposal May 2006. FA Davis.

Evans-Smith: Taylor's Clinical Nursing Skills (2005) Philadelphia: Lippincott Williams & Wilkins.

Taylor's Clinical Nursing Skills (2005) Philadelphia: Lippincott Williams & Wilkins.

Interpreting difficult ECGs (2005) Philadelphia: Lippincott Williams & Wilkins.

Kee, J. L. & Marshall, S. M. (2004). Clinical calculations (5th ed.). St. Louis: W.B. Saunders.

Chitty, K. K. (2001). *Professional nursing: Concepts and challenges (3rd ed.)*. Philadelphia: W.B. Saunders.

Other Scholarly Activities: Research practicum - Advance Directives
Gladys Husted, Principal Investigator
Duquesne University, Pittsburgh, PA
May 1996 - July 1996

Editorial Board – Nurses' Book Society, 2006

Management Institute – Duquesne University
1989 – 1990

Memberships: Sigma Theta Tau - 1993 – 1998; 2004 – present. Dual membership: Duquesne University and Waynesburg University chapters

American Association of Critical Care Nurses - member 1989-1995, 1996 - present

Oncology Nursing Society - 1993 - 1997

League of Intravenous Therapy Education - member 1993-1994

Other Professional Activities:

Instructor, Basic Cardiac Life Support, 1994- present

Instructor, Advanced Cardiac Life Support, 1991 - present

Instructor, Pediatric Advanced Life Support, 1997 - present

Regional Faculty, American Heart Association, Advanced Cardiac Life Support, 1998 - 2005

Regional Faculty, American Heart Association, Pediatric
Advanced Life Support, 1999 – 2005

Member of American Heart Association's Western District – South
Area Task Force, 2000 - 2002