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Patient Care Technology and the Nurse-Patient Relationship

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Patient Care Technology and the Nurse-Patient Relationship

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Abstract

Background: Technological devices are increasingly used in healthcare and their proliferation has providers questioning the impact on the patient-provider relationship. Technological device integration has been studied in the primary care setting, less extensively in the acute care setting. The impact of device use on the nurse-patient relationship in acute care setting required further study, particularly with nursing's history of holistic practice incorporating caring and presence.

Objectives: The study purpose was to explore the patient's perceptions of nurse caring and presence when technological devices were used in care delivery in the acute care setting. Specific aims were: 1) to describe the levels of nurse technological competency as caring and patient perceptions of caring and nurse presence, 2) to examine the relationships between patient and nurse demographics and levels of nurse technological competency as caring and patient perceptions of caring and nurse presence, and 3) to explore qualitatively the perceptions of the nurse and patient of technological device use in care delivery.

Methods: A mixed methods, descriptive, concurrent embedded design with convenience sampling was conducted in early 2014 with 112 nurse and 115 patient participants. Study measures included the Technological Competency as Caring in Nursing Instrument, the Caring Behaviors Inventory-24, and the Presence of Nursing Scale. Qualitative data was derived from semi-structured interviews with a smaller subset of participants. The setting was a community adult acute care hospital in the southwestern United States. Descriptive and inferential statistics were conducted using SPSS version 22.

Results: Nurses rated their technological competency as caring high, with a mean score of 82.71. Demographically, Asians reported a significantly higher mean score (M = 86.04) than other races. Patients rated overall nurse caring behaviors high (M = 5.44) with the positive connectedness subscale having the lowest mean score (M = 5.16). Gender and pain significantly influenced patient caring scores -- males rated overall caring, assurance of human presence, and positive connectedness higher than females. Positive connectedness was inversely related to pain occurrence. Patients rated nurse presence high (M = 115.82); age was positively correlated and significantly predicted presence scores. Qualitative themes included safety, learning and balance.

Conclusions: This study examined ratings of nurse technological competency as caring, patient perceptions of caring and nurse presence in the context of an increasingly pervasive high technology environment. Safety, learning, and balance were themes which emerged when providers and patients reflected on how technology and device use was operationalized during care delivery.

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Dedication

This dissertation is dedicated to my family. Words cannot express the appreciation I feel for the support and encouragement they provided me every step of the way during this transformational journey. Dan, thank you for tolerating the incredibly boring weekends and watching sports without sound. Jennifer, thank you for reading and critiquing. And Justin, thank you for finding those innumerable grammatical errors.

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This research study would not have been possible without the inspiration from the patients and nurses I have worked with over many years. My interactions with them set me on this road of inquiry. Most recently, the enthusiasm for this study shown by the nurses and patients at the study site has been remarkable. I have been blessed by this profession and with this dissertation I hope to honor the patients, families, and fellow nurses who have allowed me to share their experiences.

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CHAPTER I

INTRODUCTION

The increasing integration of technology into the healthcare environment has led to concerns about its influence on the provider-patient relationship. Nursing has had a long history of concern about the introduction of scientific devices and whether use of these devices has overshadowed the importance of the humane aspects of the provider-patient interaction. Watson (2001) cautioned the pace of technology entrée into the care arena might challenge the provider's ability to incorporate technology into the interaction, potentially deflecting attention to "machines" (p. xiv) and moving humanism and caring to the background.

Although this tension is not new from a nursing perspective, the increased use of technological devices has prompted medical providers to question the effect on the relationship. Most recently, medical providers have investigated the influence of electronic health records (EHR) on the interaction and have begun to realize the potential barriers technology can elicit.

The consideration about the impact of technological or digital devices is not restricted to the healthcare arena. Psychologists and social scientists, for example

Larry Rosen and Sherry Turkle, have studied the effects of digital devices on interpersonal relationships (Rosen, 2012; Turkle, 2011). Both express the concern, in this digital age we are more connected to our devices than we are to each other. No one is immune from this effect, so to expect a different dynamic in the healthcare arena is unreasonable. In the hospital setting, technological device use is prevalent in all care environments.

Background and Significance

In the United States, health and public policy has supported the use of technological devices. Promotion of health information technology was initially cited in the American Recovery and Reinvestment Act of 2009. Title XIII created the Health Information Technology for Economic and Clinical Health (HITECH) Act, which calls for use of electronic health records as a means of improving the quality of healthcare in the United States. A strategic goal of this act is the use of EHRs for all persons by 2014; financial incentives for their adoption are also part of the HITECH Act.

Weitz (2013, p.252) notes there is a "technological imperative" in the current healthcare environment. Introduction of new technological devices soon becomes an expected standard and new normal; their use and integration into care is expected by providers, consumers, and payers. Weitz further notes technology has changed healthcare, and not necessarily for the better when device use continues to distance the provider from the patient both physically and psychosocially.

The 1999 Institute of Medicine Report *To Err is Human* stated 98,000 lives are lost each year due to medical errors and has led the public to demand better care. As an example, the patient safety movement has highlighted the use of devices such as smart

intravenous pumps as an imperative to prevent medication errors (Institute for Safe Medication Practices, 2007). Concurrently the Centers for Medicare and Medicaid Services (2011) have enacted value-based purchasing – organizational quality care reimbursement measures in care process and patient experience. Patient experience measures address communication, education, and responsive provider-patient relations. Reimbursement for services is no longer based solely on clinical care measures, but now encompasses patient experience measures. Therefore, the integration of technological devices into the patient care arena may influence not only how the patient responds to interventions or treatment for a specific disease process, but also the patient's affective perception of the experience.

While healthcare technology and device use have been advertised as methodologies and a necessity to increase patient safety and care coordination, at the same time there has been a movement to embrace patient-centered care. The 2001 Institute of Medicine Report *Crossing the Quality Chasm: A New Health System for the 21st Century* presented six aims to improve quality care in the United States. One of the aims was to provide patient-centered care. Patient and family-centered care is an emergent paradigm in healthcare delivery which has been embraced by medical and nursing providers globally (Abraham & Moretz, 2012; Ives Erickson, Ditomassi, & Adams, 2012; Kjörnsberg, Karlsson, Babra, & Wadensten, 2010; Moretz & Abraham, 2012; Poochikian-Sarkissian, Sidani, Ferguson-Pare, & Doran, 2010; Reynolds, 2009; Slatore et al., 2012). Kitson, Marshall, Bassett, and Zeitz (2013) in a narrative review and synthesis of the healthcare literature determined three common themes regarding patient and family centered care. The core themes identified were the care delivery context, the

participation and involvement of the patient, and the patient-provider relationship. Currently in healthcare the care context is increasingly technology oriented, patient participation may be enhanced or mitigated by device use, and technology may modify the provider-patient relationship.

The nurse-patient relationship is predicated on an interpersonal interaction. Technological patient care devices are not neutral; how the user and receiver operationalize and perceive the device determines if it is viewed as a humanizing adjunct or dehumanizing barrier to care – again, the meaning is contextual (Barnard & Sandelowski, 2001). However, the divergent discourse about the integration of technological devices into the patient care arena is a persistent theme in nursing literature. Sandelowski (2000) in her historical review of device use in nursing noted the paucity of study about technology and stated "the nursing/technology relation has been the subject largely of...speculation rather than the focus of formal research or critique" (p. 9).

Conceptual Model

The conceptual model for this study was derived from the nursing literature and comprises technology, caring, and presence. The nurse-patient relationship is viewed as a process illuminated by the grand theories of nursing as caring, humanistic nursing, and human caring science and buttressed by the midrange theories of technological competency, caring, and presence. The successful integration of technological device use into the patient care arena is predicated on the technological competency exhibited by the nurse, which subsequently influences the patient's perceptions of caring and nurse presence. Figure 1 is a representation of the model.

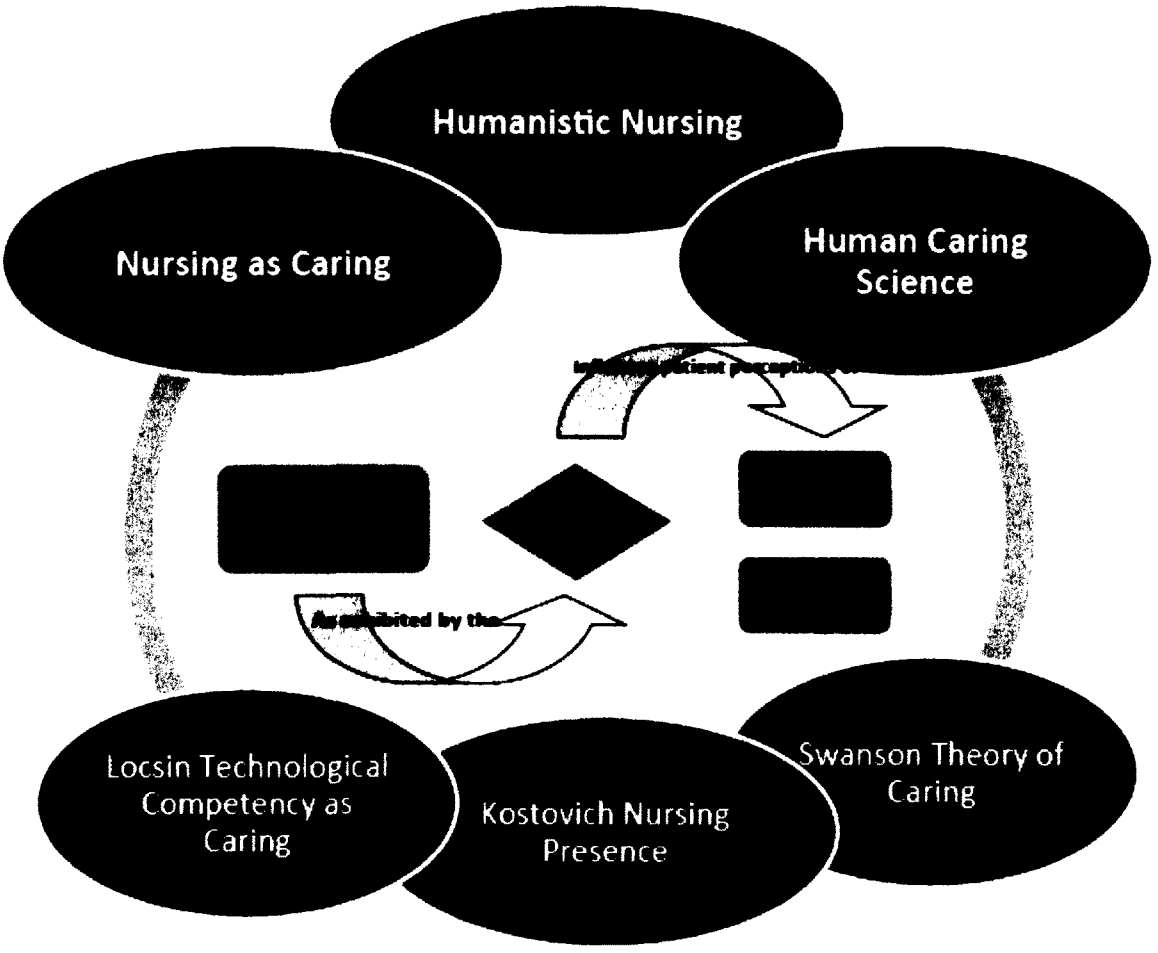

Figure 1. Conceptual Model

Assumptions

Technology

Technology is often depicted as a sociotechnical system whose components include technology, people, process, organization, and external environment (Institute of Medicine, 2012). Process is further defined as workflow, or how the operator interacts with the technological device. The Health IT and Patient Safety report notes "technology does not exist in isolation from its operator" Institute of Medicine, 2012, p. 78) and the integration of technology into the work environment is often context, organizational, and operator dependent.

Technology has been defined as both hard and soft artifacts. Hard artifacts are devices or instruments, whereas soft artifacts are the software or programming used in device design and functionality. In care delivery, what is visible to the patient is the device or instrument itself, not the internal programming or the interface among devices. Therefore the proposed study will use an operational definition of a technological device as:

> equipment designed to serve a special purpose or function, which increases productivity or eliminates manual operations.

The operational definition is an amalgam of the Merriam-Webster medical definition of device: "a piece of equipment or a mechanism designed to serve a special purpose or perform a special function" and the definition of technological: "resulting from improvements in technical processes that increase productivity of machines and eliminates manual operations or operations done by older machines." This definition is also congruent with Alliex and Irurita (2004) who, in a qualitative study of technology and nurse-patient interaction, stated "technology referred to equipment or devices connected to the patient or used directly in patient care by the nurse" (p. 33). However, although the device is observable to the patient and provider, the manner is which the device is integrated into care influences nursing practice and patient experience.

Caring

Caring and caring practices have long been a part of nursing lexicon, or as Watson stated: "the practice of Caring is central to nursing" (Watson, 2008, p.18). In the dynamic of the nurse-patient relationship, caring can be demonstrated as caring for the patient and/or caring about the patient. *Caring for* may be demonstrated as completion of

patient care tasks such as obtaining vital signs using an electronic machine or responding to an alarm on an infusion pump or cardiac monitor, whereas *caring about* the patient subsumes not only the caring for interventions but a caring about interpersonal, intersubjective relationship between the nurse and patient.

Presence

Caring and presence are often used synonymously, interchangeably, or combined as a phrase (caring presence). Finfgeld-Connett (2008a), in a qualitative comparison and synthesis of presence and caring, found the two concepts are often indistinguishable in nursing literature although frequently studied as separate constructs. She recommended further comparative study since the concepts are so embedded in nursing process, lore, and philosophical heritage.

Research Questions

The study utilized a concurrent mixed methods approach to explore the relationship between nurse technological competency and patient perceptions of caring and nurse presence. The overarching purpose was to explore the patient's perceptions of nurse caring and presence when technological devices are used in care delivery in the acute care setting. Specific research questions were:

1. What are the levels of nurse technological competency as caring, patient perceptions of caring, and patient perceptions of nurse presence?
2. What are the relationships between patient and nurse demographics and levels of nurse technological competency as caring, patient perceptions of caring, and patient perceptions of nurse presence?

3. How do nurses and patients view technological device use in the acute care setting?

Thus, the following specific aims were proposed:

1. To describe the levels of nurse technological competency as caring, patient perceptions of caring, and patient perceptions of nurse presence.
2. To examine the relationships between patient and nurse demographics and levels of nurse technological competency as caring, patient perceptions of caring, and patient perceptions of nurse presence.
3. To explore qualitatively the perceptions of the nurse and patient of technological device use in care delivery.

Summary

The purpose of the research study was to contribute a quantitative analysis of presence and caring to the discourse about technological device use in the acute care setting. Additionally, by use of two instruments to measure aspects of the nurse-patient relationship, it was anticipated a quantitative clarification of caring and presence as concepts could be further elucidated. Finally, the qualitative patient and nurse perspective of technological device use might assist in defining if these devices were viewed as a barrier or adjunct to care in the establishment of a nurse-patient relationship.

Implications for Research, Education, Practice, and Policy

The landscape of everyday life is changing with the use of technology and digital devices and technological device use is increasingly pervasive in healthcare. Nursing education, both in academia and in the care arena, must synthesize use of devices with the core concepts of nursing. Practitioners often must first master technology before

effectively integrating it into the care delivery process. Implications for academia and practice sites are to create educational methods and programs which support technological competence and proficiency, which includes the resources and time for the practitioner to learn and become comfortable with a device or software. Additionally, once the technology is introduced in the care setting, there must be support staff to assist with the implementation from both a personnel and organizational perspective.

Topol (2012) in *The Creative Destruction of Medicine* asserts a digital revolution could transform healthcare from an evidence-based, population-focused approach to an individualized, genomically-based practice. There is no question the current cost-conscious environment demands care delivery which is more efficient, effective, and personalized. Turkel and Ray (2001) assert the nurse-patient relationship is an economic resource, and cannot be valued in a straightforward cost/benefit analysis since the relationship is both process and outcome. As the paradigm of healthcare delivery shifts from a paternalistic to a patient-centered model, the increasing use of technology and digital devices could further endorse the reductionist medical model. Nursing with its historic focus on relationships and caring has the opportunity to be at the forefront of research by demonstrating how technology and digitization can simply be another method by which the patient can be known, and thereby demonstrate the true measure of a holistic, humanistic patient-provider relationship.

CHAPTER II

REVIEW OF LITERATURE

"The spectacular rise of technology in healthcare has cast a shadow on the image of caring, especially caring that is posited as the essence of a professional relationship." (Gadow, 1985, p. 31)

"Technologies, in every generation, present opportunities to reflect on our values and direction." (Turkle, 2011, p. 19)

Nearly three decades separate the two statements above, yet technology and its concomitant device use has exploded in healthcare. Technology has been integrated into all healthcare arenas; its introduction at times celebrated or unquestioned and its effects not always anticipated or explored. MacDonald (2008) and Locsin and Waraporn (2011) note technology can assist in knowing the patient, an essential component of the nurse-patient relationship, but only as long as the use of technology is a supportive, adjunctive process rather than a primary focus of the interaction. The purpose of this literature review was to examine if or how technological devices influence the interpersonal relationship between the nurse and the patient.

Technology

Historically, technology and its influence on nursing were first explored in the latter 20th century. The creation of critical care units with their use of *machine technologies* prompted nursing scholars to investigate the effect of these machines on nursing practice and patient care (Bernardo, 1998; McConnell, 1998; Purnell, 1998; Sandelowski, 1997, 1998). Barnard (1996) called for a more expansive definition of technology beyond mere machinery and tools, indicating technology was a complex phenomenon incorporating knowledge and skills and a set of activities or techniques. Barnard also countered the then prevailing notion of technology as neutral, by noting its influence on nursing practice, human experience, and values (Barnard, 1997, 1999, 2002, 2007; Barnard & Gerber 1999). Barnard and Sandelowski (2001) advanced a more comprehensive, complicated relationship between technology and care stating how technology is viewed – whether dehumanizing or humane – is user, receiver, and context dependent and often laden with implicit or explicit meaning. In a review of device use in healthcare Sandelowski (2000) stated "the technologies we human beings invent to achieve our goals, in turn, reinvent us – the way we think about ourselves, what we do, how we do it, and what we want to do" (p. 23).

Technological competency

In an early phenomenological study of caring with critical care nurses, Ray (1987) formulated a model of critical care nursing practice and is credited with coining the term *technological caring*. One theme identified in her model was technical competence, with three sub-elements: comfort with technology; technical competency; and "caring is technology" (p. 168). These sub-elements were further explicated as the nurse achieving

a level of proficiency with the technology and device and then interpreting and deriving meaning from the data. Once an integration of proficiency and meaning was achieved, the nurse then could shift her focus from the technology to the needs of the patient.

Locsin (1995, 1998) further expounded on Ray's model and created the model of technological competency as caring in nursing. Locsin's model reinforced other scholars' studies declaring technology and caring did not need to be dichotomous, but could co-exist in nursing practice. Technology could be used to know in greater detail the *what* of the patient, but merging caring and technological competence allowed for the recognition and acknowledgement of the individual and unique *who* of the patient. Technical proficiency alone is task oriented; technological competency is a means to know and care for the whole patient. As Locsin (2005) states, "the competent exhibition of technology as caring is perceived as nursing practice if grounded on a perspective of nursing; otherwise it is simply the practice of technological proficiency" (p. 81).

Recent qualitative studies have explored patient and nurse experiences with technologically intense environments. Almerud, Alapack, Fridlund and Ekebergh (2007) interviewed nine Swedish intensive care patients. Most patients described their experience as ambivalent; at times feeling safe under the constant technological monitoring and surveillance, but in other instances feeling marginalized and invisible when the providers clinical gaze did not address or recognize their unique needs or person. Analysis of narratives from sixteen patients (Lapum, Angus, Peter, & Watt-Watson, 2010) who had open-heart surgery disclosed technology played a pivotal role in their recollections, but patients often placed themselves in the background. Patients spoke of being fixed by technology, attached to technology, and surrendering agency; removal

of devices or attachments were indicators of progress. The authors noted "technology in participants' narratives was often mediated by nurses' actions and interactions....[the] authorial voice of technology became problematic when practitioners neglected listening and responding to patients in personalized ways" (p. 759). Blaxter (2009), in a case study of one patient's experience with technology, stated the use of technological images and screens was not alienating, but alienation and dehumanization occurred when the data derived from technology was used to define the patient to the exclusion of the patient's own narrative.

Multiple phenomenological studies of caregivers in inpatient critical care units identified technology related features. Nurse participants in a study in Ireland detailed three primary themes: "alien environment, pulling together, and sharing the journey" (McGrath, 2008, p. 1096). Two studies from Swedish intensive care units explored technology perspectives from nurses and medical providers. Technology was viewed as a pivotal presence in care delivery, often objectifying the patient and impeding the caregiver's ability to develop close interpersonal relationships (Almerud, Alapack, Fridlund, & Ekebergh, 2008). Technology was also a decisive factor in directing and deciding medical treatment and facilitating practice, but could complicate care by not being trustworthy, easy to use, and creating ethical dilemmas (Wikström, Cederborg, & Johanson, 2007). When technology malfunctioned (Haghenbeck, 2004) seven mid-Atlantic critical care nurses expressed incredulity, doubted their competency, and stated concerns about their external and self-image. Hawley and Jensen (2007) qualitatively investigated the meaning of making a difference with 16 critical care nurses. The nurses indicated critical care environments were high-technology environments, at times

seemingly inhumane. Counteracting dehumanization by caring included the subtheme of "combating the technological imperative" (p. 666). Finally, in a British ethnographic study, 12 nurses from intensive and step-down units indicated the nurse-technology relation was mediated by technological devices symbolizing critical illness, technology signifying a transfer of professional domain and patient geography, and transformational when technology was used to improve care and patient outcomes (Crocker & Timmons, 2009). As Lehoux (2008) stated in a reflection on the impact of health technology, "technology deeply modifies how healthcare providers and patients interact and the paths of action they can and should take" (p. 32). Technology can facilitate caring and promote positive relationships with the patient and family, but must be balanced with the competence, time, and experience of the providers before the devices can be holistically incorporated into care.

Technological Devices

Recently the technological device most heavily promoted and introduced into healthcare is the electronic health record (EHR). Although many other technological devices such as smart intravenous pumps, life supporting machines (ventilators, renal therapies, external pacemakers), and cardiac and fetal monitors, to name a few, may be used in direct patient care, much contemporary research has focused on the effect of the EHR on quality, efficiency, and the provider-patient relationship.

A touted value of EHRs is a belief that quality of care will be improved. Furukawa, Raghu, and Shao (2010, 2011) provided insight into EHR use in hospital settings. Results were mixed for labor cost savings and quality measures – increased complications and increased falls and pressure ulcers, but lower mortality for certain

conditions. The authors recommended greater scrutiny on the interface between EHRs and providers to identify and forestall occurrences which may lead to increased patient risk.

Three medical studies reviewed provider-patient relationships in primary care settings (Frankel et al. 2005, Shield et al. 2010, Ventres et al. 2006). Shield reported staff initially expressed concern about potential negative effects of computer use in the exam room, but results indicated work flow and efficiencies improved and patients overall reactions were positive. Frankel and Ventres both noted EHR influences on interactions; two domains identified were spatial (placement of EHR) and relational (participant behaviors). Electronic Health Record placement assisted or hindered integration of the computer into the visit. Frankel ascertained use of the EHR exacerbated pre-existing clinician communication styles – those who had inclusive styles utilized the EHR positively; those who were not as relational used the EHR to data gather and direct the visit flow. All authors recommend further study on how best to incorporate EHR use into the dynamics of patient-provider interactions; as Shield et al. noted, the EHR is the "third actor" (p. 325) in the room.

Expanding on the actor dynamic, researchers hermeneutically analyzed 141 videotaped consultations between physicians and patients in Australian general practice encounters (Pearce, Arnold, Phillips, Trumble, & Dwan, 2011; Pearce, Dwan, Arnold, Phillips, & Trumble, 2009; Pearce, Trumble, Arnold, Dwan, & Phillips, 2008). Overarching styles and specific behaviors of the participants were outlined. Patients and providers were identified as actors, and the computer as an actant, or non-human actor. Physicians demonstrated a unipolar or bipolar style exhibited by lower body placement –

in unipolar, the lower body maintained direction toward the computer; in bipolar orientation, the provider shifted the entire body toward or away from the computer. Patients were dyadic or triadic; a dyadic patient maintained focus on the physician, whereas a triadic patient included the computer in the consultation. Although an actant, the computer influenced the interaction passively or actively. Passive influence was due simply to object presence; active influence was attention demanded by pop-up notifications, for example. Physicians' behaviors towards patients were engaged or disengaged, or they were reflecting. Patients' behaviors with the computer were screen controlling, screen watching, or screen ignoring. The computer was informational, prompting, or distracting. However "initial behaviours have a significant influence on the gaze of the human actants" (Pearce et al., 2008, p. 205). The authors concluded the computer was a third party in the interaction, required further examination, and it demonstrated a potential shift in power and authority dynamics as information, held by the computer, patient or physician, often directed the focus and outcome of the interaction.

Linder et al. (2006) reported clinicians made a conscious choice not to use the EHR during visits because of perceived barriers to relationship building; some comments indicated use of EHR was considered rude and interfered with eye contact. Rouf, Whittle, Lu, and Schwartz (2007) surveyed patients and medical providers about the quality of the visit when a computer was used during the primary care exam. Overall the patients did not feel the computer interfered with the relationship but was user dependent – patients expressed greater feelings of depersonalization and less direct interaction with residents.

The authors surmised experience with EHR may influence the interaction and suggested future research to identify factors which positively or negatively mediate the encounter.

Duffy, Kharasch, and Du (2010) utilized simulation to compare electronic versus paper documentation of a patient admission. The simulation results showed verbal and visual interactions between the nurse and patient were lessened by an average of 50% when EHR documentation was utilized, even though more overall time was spent with the patient. Although nurses using paper documentation were more physically mobile and interactive in the room, the EHR had an "anchoring effect" (Duffy, et al., 2010, p. E9). Future research was recommended to further investigate the influence of the EHR on nurse-patient interactions and determine what methods could be used to improve these interactions.

Stuart Lewis (2011) in a commentary after implementing electronic charting in his medical practice noted, "patients do not speak template" (p. 368). He acknowledged paper charting is becoming an anachronism, but was astonished "that one of the most radical paradigm shifts in the practice of medicine feels almost like an afterthought ... my deep task is to try and accurately and comprehensively understand my patients, not merely to document them" (Lewis, 2011, p. 369). Nursing is also struggling with this paradigm shift and attempting to stay connected with the patient during this transition.

In summary, technological device use has been celebrated as improving quality and efficiency of care, but integration into care has implications beyond the introduction of a new device. Nursing studies addressing the influence of technology have been primarily qualitative; medical studies have been both qualitative and quantitative. All studies, nonetheless, corroborate Barnard and Sandelowski's precognition and Turkle's

contemporary reports of technology generating changes to relationships, values, and meanings.

Nurse Patient Relationship: Caring and Presence

Caring

Moore and Stonham (2010) note technologies present opportunities and challenges, yet insist "caring must be at the centre of an e-enabled nursing world" (p. 18). In the literature review on caring and patient provider relationships, a consensus of themes emerged as descriptors of caring. These themes were personal interest, communication, information, and compassion.

Izumi, Baggs, and Knafl (2010) described a concept development of quality nursing care for patients experiencing advanced illness. A compilation of current literature and analysis of fieldwork interviews revealed four domains described in patient interviews with caring being one domain. Of interest in the study was the increasing importance of caring to patients when they felt more vulnerable. Technological devices, as noted earlier, are often viewed as a third party in the provider-patient interaction and might further increase the patient's sense of vulnerability, particularly if the provider uses the device to data gather, rather than focusing on the interpersonal aspect of caring during an emotionally laden time.

Observations of nurse patient interactions and subsequent surveys of patient evaluations of the encounters were conducted by Henderson et al. (2007). The study sought to define what constituted caring encounters between nurses and patients. Observational data conformed to three supportive caring themes previously identified in the literature: personal connection, information sharing, and compassion. However, an

additional negative theme emerged from observation which Henderson et al. labeled "nurse forgetfulness" (2007, p. 150) – when nursing staff indicated they would follow through on a request or task but did not return for an extended period of time. Patient survey responses indicated care was primarily very good to excellent – the authors interpreted satisfaction results as proxies for care indices. However, a limitation of the study was the responses evaluated were a subset of a larger patient satisfaction survey, not a validated measure capturing patient perceptions of caring.

In a similar endeavor, Clever, Jin, Levinson, and Meltzer (2008) studied the relationship between physician communication ratings and patient satisfaction scores for 3,123 patients at an acute care hospital in Chicago. After controlling for confounding variables and specific patient attributes, satisfaction scores increased 0.58 points for each one point increase in communication ratings (both measured on a five-point scale). Recommendations from this study were to focus on communication behaviors of providers as a method to improve perceptions of quality of care. As indicated earlier, communication is often noted as a key component of caring and presence.

Focus group interviews during a study on the knowledge of genetics among elderly clients provided insight into older adults' perceptions of caring relationships between patients and healthcare providers. Calvin, Frazier, and Cohen (2007) identified three sub-themes which defined caring among participants (genuine interest, communication, and information sharing) and noted listening closely and carefully was key in building and maintaining relationships. Listening and its relationship to caring was also explored in a qualitative study of elderly long-term care clients (Jonas-Simpson, Mitchell, Fisher, Jones, & Linscott, 2006). The residents viewed careful listening as a

measure of regard, whereas silence was viewed as a measure of disregard. Newson (2006), in an appraisal on loneliness in residential care clients, also emphasized the need for skillful listening.

The perception of caring and what constitutes caring behaviors may differ between patients and nurses. Patients tend to view clinical competency as manifested by technical skills as important (Baldursdottir & Jonsdottir, 2002), in contrast nurses value affective and psychosocial skills (Palese et al., 2011; Papastavrou, Efstathiou, & Charalambous, 2011). Papastavrou and colleagues (2011) evaluated caring behaviors in a large European sample using the Caring Behaviors Inventory-24 (CBI-24) and found differences between patient and nurse perceptions. Overall CBI scores were significantly different between nurses and patients in two of the six countries (Cyprus and Czech Republic) with nurses scoring themselves higher than patients. However, there were significant differences between patients and nurses in all countries on some of the subscales of the CBI. Patients reported lower scores than nurses for two subscales: assurance of human presence and respectful deference to others ($p < .001$). The professional knowledge and skill subscale had the highest mean scores for all subscales in both respondent groups. In a small study on an inpatient oncology unit, Poirier and Sossong (2010) compared nurse and patient perceptions of caring behaviors measured by the Caring Behaviors Inventory-Elders (CBI-E) instrument. Although both groups rated overall caring behaviors high, nurses rated their caring behaviors higher than patients rated the same behaviors. Statistically significant differences were noted in scores for responsiveness, technical skills, pain management, advocacy, and appreciating uniqueness. The authors indicated no differences based on demographic measures.

Recommendations included individualizing and consulting with patients as to what they perceive as caring, providing nurses with education and orientation to improve technical skills, and ensuring policy decisions are congruent with patient-centered care principles.

Caring as a measure of patient and nurse demographics has revealed equivocal findings. Ekstrom (1999) studied the relationship between nurse gender and perceived nurse caring in 145 nurse-patient dyads. Although there were no differences in the presence of caring behaviors, there was a difference for both nurse and patient participants as to the importance of caring. Both patients and nurses scored nurse caring behaviors significantly less important for male nurses than female nurses.

Green (2004) asked 348 nurse practitioners to rate themselves on caring behaviors using the Caring Behaviors Inventory-42 (CBI-42), analyzed results based on demographic variables, and found no significant difference in scores. Patiraki et al. (2012) reviewed nurse and patient demographics on the CBI-24; patient age, admission type, and self-evaluated health status were significantly associated with total CBI scores, but explained minimal variability in the CBI (5.2%). Similarly, nurse demographics for age, overall experience, and unit-based experience were significantly correlated with total CBI scores, but demographic factors were limited in explaining variability for total CBI and sub factor scores. The authors surmise other characteristics, both patient and nurse, influence caring behaviors. Merrill, Hayes, Clukey, and Curtis (2012) used the CBI-42 with 105 moderately to severely injured trauma patients. Overall, patients scored nurse caring behaviors as high (M=5.45 on a six-point scale), with significant differences noted in some individual item scoring based on gender and ethnicity (although sample size for ethnicity was quite small [n=4]). Merrill et al. (2012) performed exploratory factor

analysis on the items and found one factor, attentive nurturing, explained 51.85% of the variance. Finally, Wolf, Miller, and Devine (2003) also used the CBI-42 to examine the relationship between caring and patient satisfaction. Caring and satisfaction had a significantly positive relationship in patients who had invasive cardiac procedures, but there was not a significant difference in caring perceptions based on gender.

Presence

Finfgeld-Connett (2008a) completed a qualitative comparison and synthesis of presence and caring and found it difficult to differentiate the two in nursing literature. The concepts and elements, historically and contemporaneously, are often intermingled in theories, models, and instruments; yet they have also been studied separately. Finfgeld-Connett (2008a) concluded the antecedents, attributes, and consequences of caring and presence overlap and have minimal differences, but recommended further study.

From a philosophical perspective, delineations between the terms *present* and *presence* were articulated by the French existentialist Gabriel Marcel in his essay *On the Ontological Mystery* (Marcel, 1969). In this essay, Marcel indicated presence implied a giving relationship rather than a mere placement of self. Sister Madeline Clemence Vaillot is credited with adopting the concept of presence from Marcel and relating it to nursing practice (Vaillot, 1966). Vaillot used presence as a defining attribute between the committed and uncommitted nurse and espoused the adoption of commitment as a means to enrich the individual patient, nurse, nurse-patient relationship, and ultimately the nursing profession.

Since Vaillot's assertion, however, a single definition of presence has been difficult due to the multiplicity of descriptions which exist in nursing (McKivergen &

Daubenmire, 1994). In an attempt to make distinctions about presence and its boundaries, researchers (Easter, 2000; Gardner, 1985; Kostovich, 2012; McKivergin & Daubenmire, 1994; Osterman, Schwartz-Barcott, & Asselin, 2010) have characterized presence as having domains (cognitive, affective, behavioral, spiritual), levels (physical, psychological, therapeutic), phases (presence, partial presence, full presence, transcendental presence), and modes (physical, therapeutic, holistic, spiritual).

Attributes of presence are communication and listening, authentic availability, attunement or connectedness, vulnerability, and valuing individuality and uniqueness (An & Jo, 2009; Bunkers, 2012; Finfgeld-Connett, 2006; Kostovich, 2012; Lewis-Hunstiger, 2011; McMahon & Christopher, 2011; Osterman et al., 2010; Trout, 2011; Zyblock, 2010). Communication is attentive, active, or responsive and need not be dialogic, but also non-verbal as manifested by body language and touch, eye contact, physical proximity, and leaning in to the patient.

Authentic availability is being accessible to the patient, or "being with" as categorized by Paterson and Zderad (1976, p. 14), and is patient focused rather than task or environment focused (Anderson, 2007; Finfgeld-Connett, 2008b; Kostovich, 2012; Lewis-Hunstiger, 2011; Osterman et al., 2010; Tavernier, 2006; Trout, 2011). Authentic availability conveys an openness and responsiveness to an interpersonal relationship.

Attunement or connectedness displays a rhythm of engagement during which all parties are closely involved and aware of each other. Vulnerability is openness; an intimate exploration of how the patient feels about his current, past or future situation (An & Jo, 2009; Davis, 2005; Gardner, 1985; Kostovich, 2012). In presence, the nurse

has committed to being with the patient during this exploration and providing comfort rather than a solution (Finfgeld-Connett, 2006; Melnechenko, 2003).

Valuing individuality and uniqueness implies a non-judgmental acceptance of the patient and the patient's experience (Benner, 2001; McMahon & Christopher, 2011; Zyblock, 2010). It is recognition of the patient as a person, an individual, who might have a unique way of responding physically, psychologically, socially, and emotionally to a clinical experience, which transcends scientific data (Doona, Chase, & Haggerty, 1999; Finfgeld-Connett, 2006).

The belief nurses and patients choose to participate in presence has resonated with nursing researchers and scholars (Bunkers, 2012; Doona, Haggerty, & Chase, 1997; Hessel, 2009; Hines, 1992; Lewis-Hunstiger, 2011; McMahon & Christopher, 2011; Melnechenko, 2003; Nelms, 1996; Osterman et al., 2010; Vaillot, 1966). The use of presence often is a personal decision to divulge or conceal oneself to another being and therefore is not automatic – the nurse must have the personal characteristics and fortitude to offer presence and the patient must express the desire or need for the interaction.

The perplexity surrounding the meaning of presence in nursing is due to its existential philosophical heritage and nursing's numerous attempts to define it. Assurance of human presence is a subscale of the CBI-24. Papastavrou et al. (2012) used the CBI-24 to compare European patients' and nurses' perceptions of assurance of human presence and found nurses rated themselves statistically significantly higher ($p < .001$) than patients on seven out of the eight items on this subscale. The only congruence among nurses and patients was the technical aspect of care. The authors surmised the disparity between perceptions might be due to personal characteristics of the nurse or factors

(organizational, environmental), which may impede the development of the nurse-patient relationship. Kostovich (2012), after a review of narrative and scholarly writings on presence, developed the Presence of Nursing Scale (PONS), the first dedicated instrument to measure nursing presence. Hansbrough (2011) in the first documented use of the instrument, administered the PONS to 75 patients in an acute care setting in the United States and noted a strong and statistically significant correlation with presence scores and patient satisfaction ($p < .01$).

Presence and caring have been elusive concepts to define, are part of the affective domain of nursing care, but when manifested can contribute positively to establishment of a mutually positive nurse-patient relationship and lend support to the emerging paradigm of patient-centered care.

Conceptual Model

The conceptual model which underpinned the study was the intersection between technology, caring, and presence in the context of the nurse-patient relationship (Figure 2). Three grand theories provided an overarching structure, with three models comprising the foundation.

The use of presence in nursing theory development was first associated with Paterson and Zderad in their Theory of Humanistic Nursing (Paterson & Zderad, 1976). Paterson and Zderad developed their theory as an outgrowth of their practice and teaching in psychiatric nursing. They felt the need to conceptualize nursing from not just a scientific method of theory creation (O'Connor, 1993) but rather to integrate the aesthetic and dialogic nature of nursing, which incorporated multiple ways of knowing one's self and another human being.

Paterson and Zderad's work was based on a consolidation and synthesis of existential philosophy as it relates to nursing, and paid direct homage to the work of theologian and philosopher Martin Buber. Buber portrayed relationships in two realms: the world of I-Thou as combination and the world of I-It as separation (Buber, 1958). Paterson and Zderad merged these views into the humanistic nursing theory by positing nursing encompasses a process which is subjective (I-Thou), objective (I-It), and intersubjective (between) with the ultimate goal of inducing well-being and more-being to provide comfort. Paterson and Zderad desired to articulate nursing as more than the *doing* of nursing, which can be scientifically and objectively observed, to include the *being* of nursing, which occurs in the intersubjective nurse-patient experience and cannot be easily measured, but they experientially believed, was nonetheless in action. However, they further clarified being has two realms very distinct from each other. "Being there" is being present, but "being with" (Paterson & Zderad, 1976, p.14) demanded active engagement and participation in the situation unfolding in the moment. Paterson and Zderad therefore classified presence in the nurse-patient relationship as transactional (objective: being there/present) or transformational (subjective: being with/presence). The characteristics of the nurse, the patient, and the intersubjective experience determined whether presence was transactional or transformational.

Kostovich based her model of nursing presence on many theorists, including Paterson and Zderad. The recognition of the patient as vulnerable, the nurse as caring and open, created the space for connectedness to occur. As Kostovich stated, nursing presence is "goal-directed attendance encompassing both being with and doing for patients" (Kostovich, 2012, p. 169).

Boykin and Schoenhofer (2001) developed their Theory of Nursing as Caring with the fundamental assumption of each person as caring, but the manifestation of caring varied based on the development and maturity of the participant and the opportunities and decision to express or withhold caring. Boykin and Schoenhofer assert, "the caring that is nursing must be a lived experience of caring, communicated intentionally, and in authentic presence through a person-with-person interconnectedness, a sense of oneness with self and other" (2001, p. 24). The major assumptions of Nursing as Caring overlap with some precepts of Humanistic Nursing. Locsin (1995) derived his model of technological competency as caring in nursing from Boykin and Schoenhofer's theory. Locsin (1998) affirms technology can be used to know the patient more fully, and competency in technology is an aspect of caring.

Watson's Human Caring Science is a seminal theory of nursing. As Watson (2012) affirms, "...human care/caring is viewed as the moral ideal of nursing" (p. 65). Watson believes caring practice is the core of the mandate and covenant nursing has with society. Watson has refined her theory over the past 30 years, but in her assessment of the current healthcare climate she cautions "...the concept of a human caring function of the nurse is threatened by technology, machines, the high-intensity pace of management, administration, documentation tasks, and the manipulation of people required to meet the needs of the systems" (2012, p. 37).

The third component of the foundation of the conceptual model was the Structure of Caring Model (Swanson, 1993). Swanson's middle range theory components include maintaining belief, knowing, being with, doing for, and enabling. Knowing and being with are key structures in Paterson and Zderad's Humanistic Nursing Theory and Boykin

and Schoenhofer's Nursing as Caring. These sub-elements of Swanson's Caring Model are congruent with nursing presence.

Sandelowski's (2000) historical review of device and technology use in nursing noted a paradigm shift from nursing observation to nursing surveillance. Sandelowski posited the transition from pre to post 1950 as moving from "world of the tool" to "world of the screen" (2000, p. 135). Device use was often an extension of the operator's hand or senses, but once devices incorporated a viewing screen, the focus shifted from direct observation and physical care to screen surveillance and a less tangible interaction with the patient.

Nursing and technological device use now resides in the domain of the screen. Nursing is challenged with balancing objective data from the screen with humanistic data from the nurse-patient interaction and integrating all into one holistic relationship. Technological device use, which is context, user and receiver dependent, influences the relationship. However, competency with technology as exhibited by the nurse, can be a manifestation of the caring and presence elements of the nurse-patient relationship, and be used to achieve and maintain patient-centered relationships.

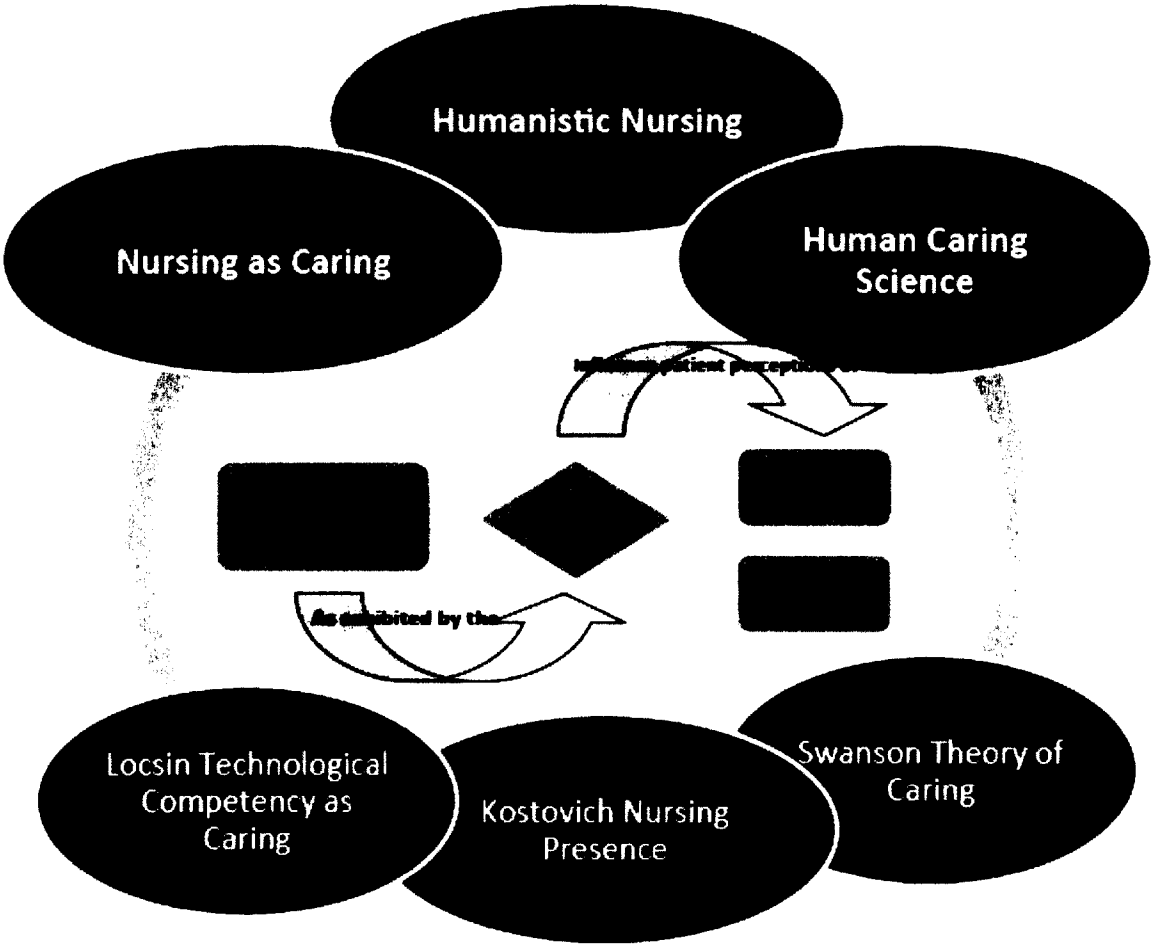

Figure 2. Conceptual Model: Integration of Technology, Caring, and Presence

Critical Analysis

The effect of technology and technological device use has not been as fully researched in the acute care setting as it has in the ambulatory care setting. Most empirical studies have focused on medical provider interactions and few on nurse interactions. Perceived benefits and barriers of technological device use might be equivalent to those in the primary care setting, but few studies have been conducted in the hospital arena to evaluate the quality of the relationship when technology, caring, and presence intersect. Challenges for technology integration in the inpatient setting are the greater complexity of care coupled with the increased vulnerability of the patient.

Nursing has a long history of embracing not only the science, but also the art, of nursing. Caring and presence have been identified as key to establishing an interpersonal relationship between the nurse and patient. Caring, presence, and interpersonal relationships cannot always be easily empirically studied and defined, but are just as critical to the patient interaction as the science and technology of healthcare.

Rationale for Study

A paucity of quantitative nursing literature was identified on the influence of technology on the nurse-patient relationship, particularly in regards to the patient's perception of caring and presence. The purpose of the mixed method study was to measure the patient's perception of caring and presence when patient care technology was used in the acute care setting and to more descriptively explore those dynamics by qualitative semi-structured interviews.

Results from this study can be used to assist in integration of patient device technology into the inpatient setting. It is critically important the interface between the patient and technology be constructed so it supports rather than impedes relationship-based care.

Conclusion

Nursing has an extensive and principled history of providing holistic patient care. The incorporation of increasingly sophisticated technology into the care arena is only escalating and has the potential to move the focus from the patient to the technology. Barriers to the interpersonal relationship have already been identified; nursing's challenge is to advocate for and promote the integration of technology as an assistive modality in overall care delivery.

CHAPTER III

METHODOLOGY

The purpose of the research study was to explore the patient's perceptions of nurse caring and presence when technological devices are used in care delivery in the acute care setting. In addition, it explored the relationship between caring and presence as a method to assist in determining if the concepts are congruent and overlap. In this chapter, a description of the study design, data collection methods and instruments, sampling, human subjects protection, and data analysis techniques are presented.

Research Design

This study used a concurrent mix methods approach to explore the relationship between nurse technological competency and patient perceptions of caring and nurse presence. A concurrent embedded strategy was performed, with quantitative data as the primary data source and qualitative data to support the explanation of the quantitative results (Creswell, 2009). Figure 3 is a model of the research strategy as outlined by Creswell.

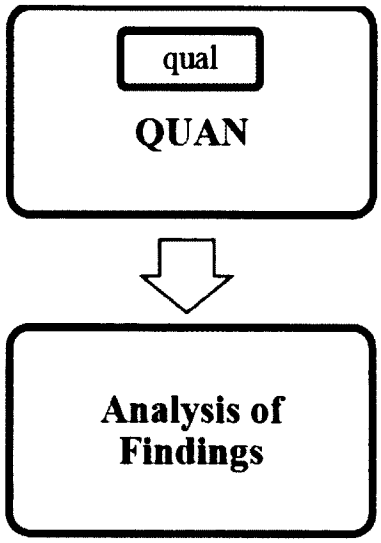

Figure 3. Concurrent Embedded Design

In the study, three instruments were used to measure the relationship between technological competency as caring, nurse presence, and caring. At the same time, the influence of technological device use was explored from the perspective of a smaller sample of nurse and patient participants in brief, semi-structured interviews. It was anticipated comparison of the data would produce a more thorough description of the phenomenon of interest as it occurred in the acute care setting.

Research questions

1. What are the levels of nurse technological competency as caring, patient perceptions of caring, and patient perceptions of nurse presence?
2. What are the relationships between patient and nurse demographics and levels of nurse technological competency as caring, patient perceptions of caring, and patient perceptions of nurse presence?
3. How do nurses and patients view technological device use in the acute care setting?

Study Aims

1. To describe the levels of nurse technological competency as caring, patient perceptions of caring, and patient perceptions of nurse presence.
2. To examine the relationships between patient and nurse demographics and levels of nurse technological competency as caring, patient perceptions of caring, and patient perceptions of nurse presence.
3. To explore qualitatively the perceptions of the nurse and patient of technological device use in care delivery.

Setting

The study site was a non-profit, community acute care hospital in the southwestern United States. The facility is a 368 bed Level I trauma center with American Nurses Credentialing Center Magnet® and Planetree Designated® Patient-Centered Hospital recognitions.

Sample

Patient participants consisted of adult patients who received treatment for surgical or medical reasons in the study facility. Participants were at least 18 years of age, oriented, able to read and write English, had visual and auditory acuity to read and/or hear the study instruments and consent information, and had spent at least 48 hours on an in-patient or observational unit (to provide an opportunity to evaluate caring and nurse presence). Exclusion criteria included patients who physically could not complete the consent or instruments, had a primary psychiatric diagnosis, were under continuous law enforcement observation, were on comfort care, were receiving continuous analgesia, or whose clinical stability level (as determined by the unit staff) would preclude

participation. Additionally, procedural areas, which provided time-limited, episodic care, were excluded.

Nurse participants consisted of registered nurses routinely assigned and employed on the care unit (to provide an accurate recording of practice area and duration of experience in the care area). Exclusion criteria for nurses were registry nurses (nurses employed by the organization's internal float pool or employed by an outside employment agency) and nurses who had been temporarily assigned to a unit for a work shift.

Power, Effect, and Sample Size

Sample size was determined a priori by various methods: Tabachnik and Fidell (as cited in Mertler and Vannatta, 2010), G*Power on-line calculation (2013), sample size table from Polit and Beck (2012), and Hulley, Cummings, Browner, Grady, and Newman (2013). Moderate effect sizes were per Cohen's conventions as cited in Polit (2010) for both correlation and multiple regression analysis as there were no prior quantitative studies which compared the exhibition of nurse technological competency as caring with patients' perceptions of caring and presence. A moderate effect size for regression is $R^2 = .13$ (Polit, 2010, p. 242); a moderate effect size for correlation is $r = .30$ (Polit, 2010, p. 202). The significance level selected was $\alpha = .05$ and power = .80.

Tabachnick and Fidell's calculations are $n \geq 50 + 8k$ for multiple correlations and $n \geq 104 + k$ for individual predictors; then utilizing the larger value. A comparison of sample size calculations is shown in Table 1. Calculations were based on an assumption of six predictor variables.

Table 1

A Priori Sample Size Calculations

	Polit & Beck	Hulley et al.	Tabachnick & Fidell	G*Power 3.1.6
Correlation	85 each group	85 each group	98	
Multiple Regression			110	100

Data Collection

Quantitative Data

A non-experimental, descriptive, correlational, predictive design was used to examine the relationships among demographic variables and nurse technological competency, patients' perceptions of caring, and nurse presence. Descriptive correlational designs are suited to describe relationships in a natural setting (Polit & Beck, 2012). Inferential statistics were used to assist in explaining or predicting which correlated factors influenced nurse technological competency as caring, and patient perceptions of caring and nurse presence.

Measures

The independent variables were nurse demographics and patient demographics. The demographic independent variables for nurse and patient participants (Appendix A and B) were included as a cover sheet to the formal instruments. The dependent variables in the quantitative design were nurse technological competency as caring, nurse caring, and nurse presence.

Technological competency was measured using the Technological Competency as Caring in Nursing Instrument (TCCNI), an instrument initially developed by Locsin

(1999) and further refined by Parcells and Locsin (2011). This instrument was selected as it was the only one the investigator could find which addressed nursing and technology as a care process as opposed to an instrument that addressed an implementation strategy for the introduction of new technology. The TCCNI is a 25-item instrument with a 100 mm visual analogue scale. Nurse participants were asked to rate their response to the instrument statements along the scale, which is bound by two dichotomous statements (strongly disagree or strongly agree). The statements reflect the five assumptions of the Technological Competency as Caring mid-range theory:

> "(a) persons are caring by virtue of their humanness, (b) persons are whole and complete in the moment, (c) knowing persons is a process allowing for continuous appreciation of persons, (d) technology is used to know persons as whole, and (e) nursing is a professional discipline" (Parcells & Locsin, 2011, p. 9).

Reliability and validity statistics for the instrument are reported as a Cronbach's alpha of 0.8129 in original testing (Locsin, 1999) and an S-CVI/Ave of 0.96 in instrument refinement (Parcells & Locsin, 2011). The instrument does not have subscales. Nurse demographics influencing TCCNI scores were education, years of experience, and area of practice (Locsin, 1999). The instrument is designed for use with both nurses and patients; however readability statistics calculated by Microsoft Word indicated a Flesch Readability Ease score of 48.7 and a Flesch-Kincaid Grade Level of 10.1. A readability ease score of 48.7 is considered difficult (Readability Formulas, 2013) and a grade level of 10.1 is considered too high for use with potential patient participants. Therefore other instruments were selected for patient use.

Caring was measured using the Caring Behaviors Inventory (CBI), a 43-item instrument initially developed by Wolf (Watson, 2009), reduced to 42 items and refined to 24 items by Wu, Larrabee, and Putman (2006). Psychometric properties of the CBI-24 reported by Wu et al. include a Cronbach's alpha of .96, convergent validity as high correlation with patient satisfaction (r = .62), and construct validity as moderate correlations with patient age (r = .23), life satisfaction (r = .19), education (r = -.11), and pain level (r = -.11). Test-retest reliability for patients was strong at r = .88. Factor analysis of patient data reduced the five subscales of the CBI-42 to four subscales: assurance of human presence, professional knowledge and skill, respectful deference to others, and positive connectedness. Instrument statements are rated on a 6-point Likert scale. The CBI-24 was recently used in a multinational European study comparing nurses and patients' perceptions of caring behaviors, specifically respectful deference to others and assurance of human presence. Papastavrou et al. (2012) analyzed data from 1537 patient respondents and 1148 nurse respondents and reported Cronbach's alpha of 0.96 for the patient sample and 0.94 for the nurse sample.

Presence was measured using the Presence of Nursing Scale (PONS), a 28-item instrument developed by Kostovich (2012). Psychometric properties of the scale as described by Kostovich include content validity by an expert panel, construct convergent validity with patient satisfaction as a point biserial correlation of 0.801, reliability measure of Cronbach's alpha of 0.95, and test-retest stability coefficient of 0.729. Patient demographic characteristics associated with variances in PONS scores included gender, ethnicity, age, education, length of stay at instrument completion, and admission diagnosis. Subsequent use of the PONS with 75 acute care patients had psychometric

properties reported by Hansbrough (2011) as a Cronbach's alpha of .937 and construct convergent validity with satisfaction of $r = .708$. No further use of the PONS could be identified in the nursing literature. Table 2 provides an outline of variables and instruments and Table 3 provides a synopsis of the instruments with reliability and validity statistics.

Table 2

Independent and Dependent Variables

Independent Variables & Instruments		
Demographics	Patient	Age Gender Ethnicity/Race Educational attainment Pain level Length of stay (LOS) Admission type (surgical or medical)
Demographics	Nurse	Age Gender Ethnicity/Race Educational attainment Years of experience Current area of practice Duration of experience in current practice area
Dependent Variables & Instruments		
Technological competency	TCCNI	25 items 100 mm interval scale
Caring	CBI	24 items 6 point Likert Scale
Presence	PONS	28 items 5 point Likert Scale

Table 3

Instrument Reliability and Validity

Variable	Instrument	Description	Reliability	Validity
Technological Competency	Technological Competency as Caring Instrument (TCCNI)	25 items 100 mm analogue scale	$\alpha = 0.8129$[1] split half[1] $r = .666$ $r = .828$ inter-item $r = .77$-$.92$[1]	Content (expert)[1, 2] Factor[1] S-CVI/UA = .72[2] S-CVI/Ave = .96[2]
Caring	Caring Behaviors Inventory (CBI-24)	24 items 6-point Likert scale 4 subscales	$\alpha = 0.96$ test/retest $r = .88$	Convergent $r = .62$ Construct: age $r = .26$ satisfaction $r = .19$ education $r = -.11$ pain $r = -.11$
Presence	Presence of Nursing Scale (PONS)	25 items 5-point Likert scale	$\alpha = 0.95$ test/retest $r = .729$ inter-item $r = .473$ (.20 - .81)	Content (expert) Convergent $r_{pb} = .801$ Known groups $p = .005$

[1]original instrument; [2]refined instrument

Qualitative Data

Selected nurses and patients were asked to participate in separate brief, semi-structured interviews. Selection was based on those who responded affirmatively to a question at the end of the formal instruments on their willingness to be interviewed about technology, caring, and presence. Questions were designed from a realist perspective with the purpose being to explore the perceptions of the nurse and patient of technological device use (Maxwell, 2013). Interview questions are listed in Table 4.

Table 4

Semi-structured Interview Questions

Participant	Questions	Readability Statistics
Patient	Do you remember a time when you were connected to a piece of equipment? Tell me a story. Do you remember a time when your IV was beeping? Tell me a story. What were the actions of the nurse? How did you perceive the actions of the nurse? What occurred? What was the response of the nurse?	Flesch readability ease = 83.8 Flesch-Kincaid grade level = 3.4
Nurse	Nurses are asked to work with more and more technological devices such as IV smart pumps, monitoring equipment, electronic health records. What devices do you work with most frequently? How do you use the device in delivering care? Do you perceive the device as a help or hindrance? Tell me more. What do you do when a device alarm goes off? Tell me about your last experience.	Flesch readability ease = 69.7 Flesch-Kincaid grade level = 6.0

Data Collection Procedures

Recruitment

Recruitment followed a phased approach. The investigator approached unit gatekeepers, defined as unit leadership (manager and clinical nurse specialist), explained the study, and if unit leadership was agreeable, asked for permission to present the study to the nursing staff. Presentations to nursing staff occurred during routine, regularly scheduled meetings (staff, unit practice council, advanced clinician, lead), and unit huddles. When both unit leadership and staff nurses provided a general consensus for participation, the unit was considered a potential study unit. Informational flyers about the study were posted in the unit conference room and lounge.

Subsequent patient and nurse recruitment was done via convenience sampling on previously identified study units. Unit charge, lead, or clinical nurse specialists were contacted by the investigator to determine if any patients or nurses on the unit met inclusion criteria. Nurses were approached by the investigator and informed about the study's purpose, methodology, data collection procedures, and protection of anonymity and confidentiality. When agreement to participate was granted, the nurse was asked to read the introductory letter and was provided an opportunity to ask additional questions. When the nurse provided verbal consent to participate, he/she was directed to complete the study forms and return them to the investigator in a sealed envelope.

For patients identified as potential study participants by unit leadership, the bedside nurse was queried for confirmatory inclusion criteria and stability before the investigator approached the patient. Patients were then contacted privately by the investigator and informed about the study's purpose, methodology, data collection procedures, and protection of anonymity and confidentiality. When agreement to participate was granted, the patient read the introductory letter and was provided with an opportunity to ask additional questions. After the patient provided verbal consent to participate, he/she was directed to complete the study forms and return them to the investigator in a sealed envelope.

Both nurse and patient participants were informed individual responses would only be known to the investigator for analysis purposes and individual responses would not be reported in the study; only aggregated data would be reported. A copy of the introductory letter was left with either participant if desired.

The second phase of data collection was purposive sampling of nurses and patients who agreed to an interview (Polit and Beck, 2012). Interviews comprised a smaller sample per Creswell's (2009) definition of a concurrent embedded design. It was anticipated the interviews would lend further explanation to the quantitative results, particularly since two of the quantitative study instruments (TCCNI and PONS) had not been used extensively in nursing research. Audio recordings with subsequent transcription comprised the data collection process for the interviews. Patient interviews occurred immediately after instrument completion, except for one patient who requested to be interviewed the next day. Nurse interviews occurred at the convenience of the participant. The two phases of data collection took approximately five months to complete.

Enrollment procedures

Nurse and patient participants were initially presented with the informed consent letter and any questions were answered. After verbal consent was received from both nurse and patient participants, the investigator presented and explained the study instruments to the participants. The patient demographic survey and study instruments (CBI-24, PONS) were provided to the patient for either independent completion or completion with assistance of the investigator. For independent completion, the participant was instructed to complete the survey and instruments without assistance from unit staff or family. For survey and instrument completion with assistance of the investigator, the investigator read the questions to the participant and logged responses. To maintain confidentiality, the interview occurred without unit staff or family present. The completed instruments were placed in a sequestered envelope in the patient's

presence. It took approximately 10 to 20 minutes to complete the patient demographic survey and instruments.

Nurse participants were provided with the demographic survey and study instrument (TCCNI) and asked to complete both privately. Completed forms were sequestered by the participant in an envelope and then returned to the investigator. It took approximately 10 to 15 minutes to complete both documents.

Participant Identification

Protected health information (PHI) was initially used for potential participant identification by unit leadership. No PHI was be needed by the investigator as study documents were completed by patient and nurse participants who either could refuse to answer specific questions or withdraw from the study at any time. No identifying information such as name, medical record number, financial visit number, or social security number was used on the study instruments. As enrollment occurred, each participant's packet of demographic survey and instruments was sequentially numbered for data entry and analysis purposes. Interview notes (written and audio) were destroyed or erased after transcription.

Data Management

All study instruments and consent forms were sequestered by the investigator and stored in a locked file cabinet in the investigator's office. Only the investigator had access to this cabinet. Responses on study instruments and interview transcriptions were entered by the investigator into a password protected database; the database was not openly accessible, as only the investigator knew the password.

Data Analysis

The Statistical Package for the Social Sciences (SPSS/22) was used for quantitative data analysis. Descriptive statistics including frequencies and means were used to describe participant characteristics. Appropriate inferential statistics were used to describe the relationship between demographics variables and nurse technological competency and patient perceptions of caring and nurse presence. To test for differences, a one-way analysis of variance (ANOVA) and independent *t*-tests were used. When indicated, linear regression analyses were used to explain the relationship between the demographic variables and the dependent variables. Correlational analyses were used to identify the relationship between caring scores and presence scores. Reliability coefficients were calculated to measure the internal consistency of the three study instruments.

Transcribed interview questions were thematically coded by the investigator using a variety of methods as outlined by Saldaña (2013).

Limitations of Methodology

The limitations of the proposed methodology were the lack of ability to generalize findings due to the study design and recruitment at a single facility.

Protection of Human Subjects

Permission to conduct the study was obtained from the Institutional Review Board (IRB) at the study site and the University of San Diego. Data collection did not occur until the investigator received approval from both review boards. Potential participants were approached by the study investigator to determine interest. When eligible participants agreed to proceed, a consent procedure was followed and included

information about the study's purpose, methodology (instrument completion and/or semi-structured interviews), data collection procedures, and protection of the subjects' anonymity and confidentiality. Consent information also included a statement noting participation was entirely voluntary and withdrawal was possible at any time. Potential participants were informed the following data instruments would be de-identified and coded with a case number to protect anonymity and confidentially; individual responses would be known only to the study investigator for data analysis purposes; and identifiable, individual responses would not be reported in the study, only aggregated data. If a participant verbally agreed to participate, the IRB-approved consent form was reviewed with the participant. A copy of the form was provided to the participant if desired.

Risks and Benefits

Participants were informed there was no anticipated immediate benefit to either the nurse or patient. Results of the study might be beneficial in the future for device or room design or educational and implementation strategies for technological devices in the acute care setting.

Potential risks to patient participants were identified as possible response burden; when a patient expressed fatigue the investigator offered to either complete the instrument verbally or terminate participation. No patient requested termination. Instrument completion and interviews were done in private hospital rooms, assuring privacy of responses. When hospital personnel entered the room, the survey or interview was paused until staff exited.

Potential risks to nurse participants were concern unit management would be apprised of individual survey or interview responses. Participants were informed all data would be de-identified, not given to institution or university management, and kept in a locked or password protected location known only to the investigator. For nurse participants who agreed to a semi-structured interview, the interview was conducted in a hospital location chosen and deemed sufficiently private by the nurse.

CHAPTER IV

RESULTS

The purpose of the study was to explore the nurse and patient perceptions of caring and nurse presence when technological devices were used in care delivery in the acute care setting. Specific research aims addressed by the study included:

1. To describe the levels of nurse technological competency as caring, patient perceptions of caring, and patient perceptions of nurse presence.
2. To examine the relationships between patient and nurse demographics and levels of nurse technological competency as caring, patient perceptions of caring, and patient perceptions of nurse presence.
3. To explore qualitatively the perceptions of the nurse and patient of technological device use in care delivery.

Quantitative study results addressed the first two aims; qualitative study results addressed the third aim.

Sample Demographics

Nurse Participants

Nurse participants included registered nurses from eight inpatient units at the study site. Data collection from nurse participants occurred over a four-month period in early 2014. A total of 114 nurses received the study instruments; 112 were returned (98% response rate).

Specific demographic indices for nurse participants are presented in Table 5. Age, years of nursing experience, and years in current practice area were positively skewed, therefore the median is presented in addition to mean. No registered nurse participants had a Diploma or Doctorate degree as their highest nursing degree and no nurses indicated an American Indian/Native Alaskan background.

Table 5

Registered Nurse Demographics

Demographic Variable		N=112(%)
Age in years	Mean	34.88
	Median	32.00
	SD	9.44
Gender	Female	94 (83.9)
	Male	18 (16.1)
Hispanic	Yes	5 (4.5)
	No	107 (95.5)
Race	White	63 (56.3)
	Asian	33 (29.5)
	Two or more Races	4 (3.6)
	Black/African American	4 (3.6)
	Native Hawaiian/Pacific Islander	3 (2.7)
	Other	5 (4.5)
Highest Nursing Degree	Associate Degree	17 (15.3)
	Bachelor's Degree	89 (80.2)
	Master's Degree	5 (4.5)
Years of Nursing Experience	Mean	9.42
	Median	6.00
	SD	9.69

Years in Current Practice Area	Mean	7.09
	Median	4.50
	SD	8.02
Current Practice Area	Surgical Intensive Care	12 (10.7)
	Medical Intensive Care	12 (10.7)
	Surgical Progressive Care	24 (21.4)
	Medical Progressive Care	21 (18.8)
	Medical Acute	12 (10.7)
	Surgical Acute	18 (16.1)
	Rehabilitation	4 (3.6)
	Oncology	9 (8.0)

Patient Participants

Patient participants included patients from the same eight inpatient units at the study site. Data collection for patient participants also occurred over a four-month period. A total of 125 patients were approached for participation; 10 refused (8% refusal rate). Typical reasons given for non-participation included: "not interested right now," "I never do research studies," or "too tired, too much going on." The final patient participant sample was 115. Demographic data on all patient participants is outlined in Table 6.

Table 6

Patient Demographics

Demographic Variable		N=115 (%)
Age in years	Mean	59.60
	Median	61.00
	SD	15.60
Gender	Female	51 (44.3)
	Male	64 (55.7)
Hispanic	Yes	20 (17.4)
	No	95 (82.6)
Race	White	81 (70.4)
	Asian	6 (5.2)
	Two or more Races	2 (1.7)
	Black/African American	11 (9.6)
	Native Hawaiian/Pacific Islander	1 (.9)
	American Indian/Native Alaskan	2 (1.7)
	Other	12 (10.4)

Highest Education Level	High School or Less	32 (27.8)
	College	57 (49.6)
	Post Graduate	26 (22.6)
Highest Earned Degree	Some college, no degree earned	30 (36.1)
	Associate Degree	12 (14.5)
	Bachelor's Degree	26 (31.3)
	Master's Degree	10 (12.0)
	Doctorate	5 (6.0)
Number of Admissions in Last Five Years	Mean	4.51
	Median	2.00
	SD	8.36
Reason for Current Admission	Medical	63 (54.8)
	Surgical	52 (45.2)
Current Length of Stay (days)	Mean	8.87
	Median	5.0
	SD	11.06
Current Location	Surgical Intensive Care	10 (8.7)
	Medical Intensive Care	7 (6.1)
	Surgical Progressive Care	20 (17.4)
	Medical Progressive Care	21 (18.3)
	Medical Acute	13 (11.3)
	Surgical Acute	25 (21.7)
	Rehabilitation	10 (8.7)
	Oncology	9 (7.8)
Currently Experiencing Pain	Yes	44 (38.3)
	No	71(61.7)
If yes, current pain level (scale 0-10)	Mean	4.32
	Median	4.00
	SD	2.20

Quantitative Analysis

Nurse and patient participant data were analyzed separately. Results for nurse quantitative data for Aim 1 and 2 are presented first, followed by patient quantitative data. Patient quantitative data utilized two instruments measuring caring and nurse presence. The two constructs of caring and nurse presence are described separately.

Aim 1. To describe the levels of nurse technological competency as caring, patient perceptions of caring, and patient perceptions of nurse presence.

Aim 2. To examine the relationships between patient and nurse demographics and levels of nurse technological competency as caring, patient perceptions of caring, and patient perceptions of nurse presence.

Analysis of Registered Nurse Data

Aim 1a: To describe the levels of nurse technological competency as caring.

As noted previously, the sample size for nurse participants was 112. Five cases had missing data (4.3%) – four participants for demographic variables and one participant for a single item in the Technological Competency as Caring in Nursing (TCCNI) instrument. Case mean substitution and regression were compared to impute the response to the single item (1:25 items) in the TCCNI. The calculated value was congruent for both methods; therefore the value was entered into analysis for this participant. Since the missing data rate was less than 5%, all participants were included in analysis.

Technological competency as caring in nursing was computed as an aggregate score of 25 items. Participants rated an item from 0 to 100 on a 100-mm visual analogue scale. Scores on the TCCNI were normally distributed overall and within each demographic subgroup. Scores indicated the majority of participants self-assessed their technological competency as caring on the high end of the scale (M = 82.72, SD = 7.56).

Analysis of individual items revealed the item with the lowest mean score (67.3) was item 2: "Technology assists nurses in knowing the 'who' and the 'what' of persons" (Locsin, 1999). The item with the highest mean score (91.54) was item 5: "Caring is engaging in compassion, physical presence, comforting, and respecting the whole person" (Locsin, 1999). All other item mean scores ranged from 71.23 to 90.94. The

majority of items (16/25; 64%) had mean scores in the 80's. Six items had mean scores less than 80 (67.30 to 77.00). A review of the items with the lowest mean scores revealed the five of six items emphasized technology as they contained the root "techno" in some form (technology, technologies, technological).

Table 7

TCCNI Items with Root "Techno"

	Mean	Median	*SD*
Item 2	67.30	73.00	23.08
Item 6	71.85	74.50	18.05
Item 10	87.59	91.50	11.74
Item 13	73.26	78.50	21.87
Item 24	71.23	75.50	18.96
Item 25	77.00	79.50	17.03

Research Question 1a: What are the levels of nurse technological competency as caring.

Nurses rated their level of technological competency as caring as high, as indicated by an aggregate mean score of 82.72 (*SD* = 7.56). Individual participant responses for the 25-item scale ranged from 63.16 to 98.36.

Aim 2a: To examine the relationships between nurse demographics and nurse technological competency as caring.

There were no significant differences between TCCNI scores and any demographic variables other than race. As outlined in the prior demographic table, participants who identified themselves as White constituted 56% of the sample, followed by Asian at 30%. Race was therefore categorized into three subgroups: White, Asian, and Other. A one-way Analysis of Variance indicated significant differences in mean TCCNI scores among groups (F [2,109] = 6.600, p = .004, partial η^2 = .109). Normality

assumptions were met; homogeneity of variance was not met according to Levene's test (p = .039), but comparison of lowest to highest standard deviation did not exceed three. Two *post hoc* tests were run: Hochberg's GT2 due to unequal group sizes (63, 33, 16) and Bonferroni with correction. Results indicated composite TCCNI scores were higher in the Asian group (M = 86.04, SD = 5.41) relative to the White group (M = 80.57, SD = 7.84, p =. 002). No significant differences were found between groups Asian and Other (p =. 818) or White and Other (p =. 184).

Subsequent analyses were done to determine if other demographic variables such as age, years of nursing experience, years in current practice area, and highest nursing degree could explain differences in TCCNI scores between race groups. Age, years of nursing experience, and years in current practice area were not normally distributed, therefore were categorized. Age was categorized into 4 groups (20-29, 30-39, 40-49, 50+) and Fisher's exact test approached, but was not significant, p = .058.

Years of nursing experience were categorized into four groups (0-5, 6-10, 11-15, 16+) and Fisher's exact test (p < .001) indicated significant differences in proportions among groups. Whites had the largest proportion in the 0-5 years of experience (80% versus Other at 10.9%, versus Asian at 9.1%); Asians had the largest proportion in 6-10 years (Asian, 60.9%, White, 21.7%, Other, 17.4%).

Years of experience in current practice area (categories 0-5 years, 6-10 years, 11 or more years) were significant at p < .001 using a Fisher's exact test. Whites had the largest percentage in 0-5 years (70.6%) compared to Asian (16.2%) and Other (13.2%). Asians had the highest percentage in 6-10 year at 60%, while White and Other were equivalent at 20%. It is not surprising that years of nursing experience and years in

current practice area demonstrated similar results, as these variables were strongly correlated, r_s (112) = .923.

Finally a Kruskal-Wallis *H* test was conducted to compare highest nursing degree. Visual inspection of boxplots indicated distributions of highest degree were not similar for all groups. Highest nursing degree increased from the race categories of Other (mean rank = 53.73) to White (mean rank = 55.17) to Asian (mean rank = 58.61), but the differences were not statistically significant, $\chi^2(2) = .691$, $p = .708$.

Research Question 2a: What is the relationship between nurse demographics and nurse technological competency as caring.

All nurses demonstrated high mean scores for technological competency as caring. Analysis of demographic variables indicated no significant differences based on demographic variables other than race. Asians reported the highest mean scores; Asian nurses also had the largest proportion in the 6-10 year categories for overall experience and experience in current practice area.

Analysis of Patient Data

There was a notable amount of missing data in patient surveys. Patients with complete data on both instruments were 87/115 or 75.6%. Patients completed all items on the Caring Behaviors Inventory (CBI-24) instrument (86.1%) more often than all items on the Presence of Nursing Scale (PONS) Instrument (80.8%). There was some overlapping in missing data between both the CBI and the PONs. The following table outlines the occurrence of the missing data. It should be noted the PONS had an initial question asking whether the presence of registered nurses made a difference; 5/115 (4.3%) participants indicated it did not. Per instrument instructions, subsequent answers

exploring presence were not answered; these participants are included in the non-response calculations shown in the table below.

Table 8

Patient Missing Data Instrument Comparison

	Complete data on both instruments	Missing Data CBI only	Missing data PONS only	Missing data on both CBI and PONS
n	87	6	12 (3*)	10 (2*)
%	75.7	5.2	10.4	8.7

*Indicated nursing presence did not make a difference

Analysis was done to compare patients with complete data to those with incomplete data. In examining the occurrence of missing data, comparisons were made based on age, gender, Hispanic/Latino ethnicity, race (reduced to White or Other), education level, college degree, number of admissions, length of stay, reason for admission, level of care, and pain. Continuous demographic variables included age and pain level, number of admissions in last five years, and length of stay. Only age and pain level were normally distributed, therefore number of admissions and length of stay were categorized.

No statistically significant differences between patients with complete or missing data were noted for age ($t[113] = .796, p = .428$), gender ($\chi^2[1] = .384, p = .535$), race ($\chi^2[1] = 2.436, p = .119$), length of stay 4 categories ($\chi^2[3] = 2.331, p = .507$), admission reason ($\chi^2[1] = .022, p = .882$), critical versus acute level of care ($\chi^2[1] = .850, p = .357$), ICU, PCU, or acute care level of care ($\chi^2[2] = .971, p = .615$), current report of pain ($\chi^2[1] = .181, p = .670$), or pain level ($t[42] = -1.013, p = .317$).

Statistically significant differences for missing data were found based on Hispanic/Latino ethnicity and number of admissions in last five years. Participants

reporting Hispanic or Latino ethnicity had a lower rate of missing data (5.0%) than non-Hispanics (28.4%), $p = .041$, Fisher's exact test. There was an inverse association for missing data based on number of admissions in last five years. Patients with one admission had 31.7% missing data, 2-3 admissions had 29.5% missing data, and those with 4 or more admissions had 6.7% missing data, $\chi^2(2) = 6.943$, $p = .031$, Cramer's V = .246.

Earning a college degree approached statistical significance, ($\chi^2[1] = 3.187$, $p = .074$); therefore additional analysis was done based on education level. As education increased, the proportion of missing data increased (high school or less = 6.3%, college = 28.1%, post graduate = 38.5%), $\chi^2(2) = 8.931$, $p = .012$, Cramer's V = .279.

Survey instruments were subsequently examined for patterns of missing data. As reported previously, there was less missing data on the Caring Behaviors Inventory (CBI). For participants who had missing data on the CBI only, most (5/6) were missing data on one item. The item with the greatest non-response was "Treating patient information confidentially" (Wu et al., 2005). During the time of data collection, the national news highlighted discussions about the National Security Agency and domestic surveillance. Additionally, a national department store reported a data security breach for credit and debit card customers. It is presumed this produced a non-response bias as some participants in answer to this question wrote or stated, "How would I know? / I have no idea."

For participants missing data on the PONS only and who indicated nursing presence made a difference (n=9), 78% were missing data on only one item. The item on the PONS with the most non-response (5/9) in this group was "These registered nurses

met my spiritual needs" (Kostovich, 2012). Many patients left this item blank or indicated "not applicable;" some verbalized a response indicating they had no spiritual needs and one stated "it is not their (registered nurses) responsibility to meet my spiritual needs."

For participants who had missing data on both instruments and who indicated nursing presence made a difference (n=8), non-response ranged from 2 to 4 items. The item with the most non-response in this group was again the question on spiritual needs (87.5%).

Due to differences in response rates between the two instruments, patient analysis proceeded in three phases: analysis with complete data on both instruments, analysis with complete data on the Caring Behaviors Inventory, and finally analysis with complete data on the Presence of Nursing Scale. Table 9 compares demographics among patient in these three groups. Demographically, minimal disparity was noted.

Table 9

Demographics on Patient Participants

		Complete data CBI-24 & PONS	Complete data CBI-24	Complete data PONS
Demographic Variable		n=87 (%)	n=99 (%)	n=93 (%)
Age in years	Mean	58.94	59.31	58.82
	Median	60.00	60.00	60.00
	SD	15.57	15.62	15.35
Gender	Female	40 (46.0)	46 (46.5)	41 (44.1)
	Male	47 (54.0)	53 (53.5)	52 (55.9)
Hispanic	Yes	19 (21.8)	19 (19.2)	19 (20.4)
	No	68 (78.2)	80 (80.8)	74 (79.6)
Race	White	58 (66.7)	68 (68.7)	63 (67.7)
	Asian	5 (5.7)	5 (5.1)	6 (6.5)
	Two or more Races	2 (2.3)	2 (2.0)	2 (2.2)
	Black/African American	9 (10.3)	11 (11.1)	9 (9.7)
	Native Hawaiian/Pacific Islander	1 (1.1)	1 (1.0)	1 (1.1)
	American Indian/Native Alaskan	2 (2.3)	2 (2.0)	2 (2.2)

	Other	10 (11.5)	10 (10.1)	10 (10.8)
Education	High School or Less	30 (34.5)	30 (30.3)	31 (33.3)
	College	41 (47.1)	50 (50.5)	44 (47.3)
	Post Graduate	16 (18.4)	19 (19.2)	18 (19.4)
Degree	Associate Degree	10 (17.5)	12 (17.4)	10 (16.1)
	Bachelor's Degree	16 (28.1)	21 (30.4)	17 (27.4)
	Master's Degree	7 (12.3)	7 (10.1)	9 (14.5)
	Doctorate	3 (5.3)	3 (4.3)	3 (4.8)
# Admissions Last 5 Years	Mean	5.38	4.99	5.14
	Median	3.00	3.00	3.00
	SD	9.45	8.92	9.18
Admission Reason	Medical	48 (55.2)	55 (55.6)	52 (55.9)
	Surgical	39 (44.8)	44 (44.4)	41 (44.1)
Length of Stay (days)	Mean	9.22	9.13	9.37
	Median	6.00	6.00	6.00
	SD	12.02	11.64	11.82
Location	Surgical Intensive Care	8 (9.2)	9 (9.1)	8 (8.6)
	Medical Intensive Care	6 (6.9)	6 (6.1)	6 (6.5)
	Surgical Progressive Care	12 (13.8)	15 (15.2)	15 (16.1)
	Medical Progressive Care	20 (23.0)	20 (20.2)	20 (21.5)
	Medical Acute	10 (11.5)	13 (13.1)	10 (10.8)
	Surgical Acute	18 (20.7)	21 (21.2)	19 (20.4)
	Rehabilitation	5 (5.7)	7 (7.1)	6 (6.5)
	Oncology	8 (9.2)	8 (8.1)	9 (9.7)
Experiencing Pain	Yes	34 (39.1)	40 (40.4)	36 (38.7)
	No	53(60.9)	59 (59.6)	57 (61.3)
If yes, current pain level	Mean	4.50	4.48	4.42
	Median	4.00	4.00	4.00
	SD	2.25	2.22	2.21

Analysis of Patient Data: Caring

Aim 1b: To describe the levels of patient perceptions of caring.

Caring was measured using the Caring Behaviors Inventory-24. The instrument produced an overall composite score, and scores for four subscales: assurance of human presence, professional knowledge and skill, respectful deference to others, and positive connectedness. Items were answered based on a Likert scale ranging from 1-6 (never, almost never, occasionally, usually, almost always, always).

Results for patients with complete data on both instruments.

The overall composite score and subscale scores are listed in Table 10. Scores for all scales were not normally distributed and demonstrated a negative skew with high mean and median scores. Outliers were assessed via Mahalanobis distance and none were identified. Overall, patient ratings for caring behaviors were viewed positively. The subscale with the lowest mean, median, and range was positive connectedness.

Table 10

Patient Perceptions of Caring as Measured by CBI-24

n = 87	Mean (*SD*)	Median	Range	Skew	Kurtosis
Overall score	5.44 (.58)	5.63	3.58 – 6.00	-1.142	.517
Assurance of human presence	5.52 (.57)	5.75	3.88 – 6.00	-1.187	.558
Professional knowledge and skill	5.53 (.52)	5.8	4.00 – 6.00	-1.262	.979
Respectful deference to others	5.48 (.63)	5.67	3.33 – 6.00	-1.391	1.565
Positive connectedness	5.16 (.83)	5.40	2.60 – 6.00	-.911	.063

To determine if these results were consistent with a slightly larger sample size, data were analyzed for the set of patients who completed the CBI-24, but not both instruments.

Results for patients with complete data on the CBI-24.

Scores were not normally distributed, but no univariate outliers were identified via Mahalanobis distance. Results were congruent with the smaller sample, and ratings on connectedness continued to be the lowest among the subscales.

Table 11

Patient Perceptions of Caring as Measured by CBI-24

n = 99	Mean (*SD*)	Median	Range	Skew	Kurtosis
Overall score	5.44 (.58)	5.63	3.58 – 6.00	-1.161	.592
Assurance of human presence	5.50 (.57)	5.75	3.88 – 6.00	-1.151	.443
Professional knowledge and skill	5.56 (.51)	5.80	4.00 – 6.00	-1.325	1.250

Respectful deference to others	5.48 (.64)	5.67	3.33 – 6.00	-1.465	1.759
Positive connectedness	5.17 (.84)	5.40	2.60 – 6.00	-.992	.310

Comparison of mean scores between the various sample subgroups for the CBI-24 and subscales were not statistically significant. Therefore it was decided to answer the first research question and analyze the second aim with the patient sample consisting of complete data on both the CBI and PONS instruments, and not proceed with separate analyses for the slightly larger samples based on individual instrument completion.

Research Question 1b: What are the levels of patient perceptions of caring.

Patients rated caring behaviors universally high, between almost always to always. Professional knowledge and skill was the highest rated subscale and positive connectedness was the lowest rated subscale.

Aim 2b: To examine the relationships between patient demographics and patient perceptions of caring.

There were no significant differences in patient caring perceptions based on age, race, education level, college degree, number of admissions, admission reason, length of stay, or location of care. There were significant differences in patient perceptions of caring based on gender and occurrence of pain.

An independent samples *t*-test was done to test for differences in mean CBI scores and subscale scores between male and female patients. Although scores were not normally distributed in each group per Kolmogorov-Smirnov and Shapiro-Wilk tests, group sizes were roughly equivalent. Homogeneity of variance was violated, therefore a *t*-test assuming non-constant variance was calculated. Male patients rated overall caring,

assurance of human presence, and positive connectedness significantly higher than female patients. Effect size was calculated using Cohen's *d*.

Table 12

Comparison of CBI Scores by Gender

	Male n = 47		Female n = 40					
	Mean	*SD*	Mean	*SD*	*t*	*df*	*p*	Cohen's *d*
CBI overall	5.56	.47	5.29	.66	2.09	69.53	.040	0.482
Assurance of human presence	5.65	.48	5.36	.62	2.45	72.39	.017	0.529
Positive connectedness	5.33	.69	4.96	.93	2.08	70.95	.041	0.462

The occurrence of pain (yes/no) also influenced patient perceptions of caring. Patients who were in pain reported lower scores on the positive connectedness subscale of the CBI ($M = 4.94$, $SD = .92$) than patients who reported no pain ($M = 5.30$, $SD = .74$), as analyzed by a two-tailed independent groups *t*-test ($t[85] = 2.02$, $p = .047$).

Since scores for positive connectedness were influenced by both gender and pain, a one-way Analysis of Covariance (ANCOVA) was conducted to determine if gender results continued to be significant once pain was used as a covariate. Assumptions for homogeneity of variance ($p = .319$) and homogeneity of regression ($p = .063$) were met. ANCOVA results indicated gender significantly influenced positive connectedness scores after controlling for the effect of pain, $F(1,83) = 6.369$, $p = .014$. Adjusted mean scores for males ($M = 5.33$) were higher than females ($M = 4.89$). Gender explained a minimal amount of variance in scores, partial $\eta^2 = .071$.

Research Question 2b: What are the relationships between patient demographics and patient perceptions of caring.

Males scored overall caring behaviors and specific caring behaviors relative to assurance of human presence and positive connectedness significantly higher than females. Pain also significantly influenced patients' perceptions of caring as measured by the positive connectedness subscale of the CBI-24. Patients in pain reported lower perceptions of positive connectedness. After controlling for the effect of pain, male patients still had significantly higher positive connectedness scores.

Analysis of Patient Data: Nurse Presence

Aim 1c: To describe the levels of patient perceptions of nurse presence.

Nurse presence was measured using the Presence of Nursing Scale. The instrument consists of 28 items, 25 of which were used to compute an aggregate score for nurse presence. Ratings were based on a Likert scale from 1-5 (never, rarely, occasionally, frequently, always). The initial item asked if nursing presence made a difference (yes or no), the last two items asked about satisfaction with care (very dissatisfied, dissatisfied, neither satisfied or dissatisfied, satisfied, very satisfied).

Results for patients with complete data on both instruments.

The overall score is listed in Table 13. Scores were not normally distributed and one outlier case was identified via Mahalanobis distance. Rather than deleting this case the PONS score for this participant was recoded to one less than the next lowest score. The two items, which asked for levels of satisfaction with nursing care, had mean scores of 4.84 and 4.75, consistent with the high ratings for nurse presence.

Table 13

Patient Perceptions of Nurse Presence as Measured by the PONS

n = 87	Mean (*SD*)	Median	Range	Skew	Kurtosis
Overall score	115.82 (10.55)	120	87 - 125	-1.150	.430

As was done with the CBI, a second analysis was conducted with the larger sample of patient who completed the PONS, but not both instruments.

Results for patients with complete data on the PONS.

A second outlier case was identified via Mahalanobis distance and this case was recoded as previously described. Results are listed in Table 14. Levels of satisfaction with nursing care ($M = 4.81$ and $M = 4.71$) did not change.

Table 14

Patient Perceptions of Nurse Presence as Measured by the PONS

n = 93	Mean (*SD*)	Median	Range	Skew	Kurtosis
Overall score	115.05 (11.13)	119	87 - 125	-1.104	.276

Comparison of mean scores between the two groups was not statistically significant. The second aim for nurse presence was analyzed with the smaller sample size. This allowed for analysis to be a consistent sample for both patient constructs.

Research Question 1c: What are the levels of patient perceptions of nurse presence.

Patient perceptions of nurse presence were high, scoring these behaviors as occurring frequently to always.

Aim 2c: To examine the relationships between patient demographics and patient perceptions of nurse presence.

Relationships between demographic variables and PONS scores were analyzed by correlation (Pearson and Spearman), *t*-test, and one-way Analysis of Variance. The only demographic variable that showed significant results was age.

Pearson correlation indicated a positive relationship between age and PONS scores, $r(85) = .295$, $p = .006$. As age increased, patient perceptions of nurse presence increased. A regression was conducted to evaluate how well age was associated with PONS scores. Preliminary data analysis showed a linear relationship between age and PONS scores via visual inspection of scatterplot. Age significantly predicted PONS scores, B = .200, $\beta = .295$, $t(85) = 2.847$, $p = .006$ and explained a small, but significant proportion of variance in PONS scores, $R^2 = .087$, $F(1,85) = 8.106$, $p = .006$.

Research Question 2c: What are the relationships between patient demographics and patient perceptions of nurse presence.

As patient age increased, patient perceptions of nurse presence increased.

Qualitative Analysis

Qualitative interviews were conducted during the same timeframe as quantitative data collection. Participants were a subset of nurses and patients who completed the quantitative instruments. Twenty-three nurses and fifteen patients participated in short, semi-structured interviews. Demographic indices for nurse interviewees are listed below.

Table 15

Registered Nurse Interview Participants

Demographic Variable		n=23 (%)
Age	Mean	33.30
	Median	32.00
	SD	8.54
Gender	Female	19 (82.6)
	Male	4 (17.4)
Hispanic	Yes	1 (4.3)
	No	22 (95.7)
Race	White	16 (69.6)
	Asian	4 (17.4)
	Two or more Races	1 (4.3)
	Black/African American	1 (4.3)
	Native Hawaiian/Pacific Islander	1 (4.3)
	Other	0
Highest Nursing Degree	Associate Degree	4 (17.4)
	Bachelor's Degree	16 (69.6)
	Master's Degree	3 (13.0)
Years of Nursing Experience	Mean	7.50
	Median	4.75
	SD	9.52
Years in Current Practice Area	Mean	5.57
	Median	4.00
	SD	8.49
Current Practice Area	Medical Intensive Care	6 (26.1)
	Surgical Progressive Care	2 (8.7)
	Medical Progressive Care	4 (17.4)
	Medical Acute	4 (17.4)
	Surgical Acute	3 (13.0)
	Rehabilitation	1 (4.3)
	Oncology	3 (13.0)

Nurses were interviewed at a time and place of their convenience. All nurses were interviewed at a time separated from quantitative instrument completion. Demographic profiles between interview participants and the full cohort of nurse participants were similar, except no nurses who worked in the surgical intensive care unit were interviewed as saturation occurred before these nurses could be interviewed. Patient interviews

occurred immediately after instrument completion, except for one patient who requested an interview for the following day. Patient interviewee demographics are listed below.

Table 16

Patient Interview Participants

Demographic Variable		n=15 (%)
Age	Mean	56.27
	Median	58.00
	SD	15.60
Gender	Female	10 (66.7)
	Male	5 (33.3)
Hispanic	Yes	2 (13.3)
	No	13 (86.7)
Race	White	13 (86.7)
	Black/African American	1 (6.7)
	Other	1 (6.7)
Education Level	High School or Less	4 (26.7)
	College	6 (40.0)
	Post Graduate	5 (33.3)
Highest Earned Degree	Some College, no degree earned	2 (18.2)
	Associate Degree	2 (18.2)
	Bachelor's Degree	3 (27.3)
	Master's Degree	3 (27.3)
	Doctorate	1 (9.1)
# Admissions in Last 5 Years	Mean	3.73
	Median	3.00
	SD	3.75
Reason for Current Admission	Medical	10 (66.7)
	Surgical	5 (33.3)
Current Length of Stay (days)	Mean	14.67
	Median	5.0
	SD	20.47
Current Location	Medical Intensive Care	1 (6.7)
	Medical Progressive Care	3 (20.0)
	Medical Acute	3 (20.0)
	Surgical Acute	5 (33.3)
	Rehabilitation	1 (6.7)
	Oncology	2 (13.3)
Currently Experiencing Pain	Yes	6 (40.0)
	No	9(60.0)
If yes, current pain level (scale 0-10)	Mean	4.67
	Median	4.50
	SD	1.86

Qualitative analysis was done to determine if quantitative study results could be further clarified.

Aim 3: To explore qualitatively the perceptions of the nurse and patient of technological device use in care delivery.

Although data collection for qualitative participants could not be done as a nurse-patient dyad, this was reasonable as nurse and patient participants did not complete the same quantitative instruments. Qualitative analysis of patient and nurse participants occurred in two stages. First cycle coding consisted of attribute, holistic, and attribute coding (Saldaña, 2013) followed by eclectic second cycle coding.

Technology and technological device use were generally viewed as a positive event in care delivery. The overriding theme for both patients and nurses was technology and technological device use provided a safety net. However, technology and device use were not without challenges. Perception was moderated by the reason or purpose of the device and how the user operationalized the device.

Patients viewed safety as a prime outcome, but also technology as a process which usually improved care by making care delivery more efficient, easier, and faster for the providers. Nurses viewed technology as providing intrinsic safety measures (such as infusion parameters on smart intravenous pumps), but also allowing alarms to be set which notified providers about abnormal physiologic events.

There were, however, some distinctions between how patients and nurses viewed technological devices. Patients were connected to devices, and nurses utilized devices to deliver care – responses to the interview questions noted that difference.

Patients described being connected to equipment as positive, negative or equivocal depending on how they perceived the device was related to their treatment. Positive responses included "the pain killing machine...I really enjoyed that experience because it worked and was so easy" and "thanks to that I'm still here." Equivocal responses included statements such as "not bad," "no unpleasantness," or it "wasn't a problem." Negative responses were not related to the device itself, but how use of the device was operationalized. If the device was not explained, the patient felt "they just didn't care...they weren't concerned...and just shoved" and patients became upset with caregivers.

Patients were very observant on how nurses interacted with devices. If they felt nurses "took care of business" or did their "job in a concise manner" then nothing was amiss as exemplified by "no concern on her face, therefore no problem." If patients observed frustration due to the introduction of new technology, they stated the need for a training program or in one instance "helped the nurse figure it out." Explanations were important for patients, and if provided, then the patient became an advocate for the nurse.

Although nurses appreciated the safety features of the devices, nurses often spoke of the troubleshooting and expenditure of time required when devices malfunctioned ("always those hiccups that happen with the equipment"). Time for troubleshooting took time away from patient care, or in some instances actually interfered with requisite care treatments such as when intravenous pumps would not deliver a vasoactive medication.

Another striking difference was nurses viewed the use of technology as "it's really just a balance" in how the technology was used: "there's pluses and minuses to it." Technology permitted nurses to "get data," "feel much more informed," and "allows me

to keep the type of eyes that I want on the patient." Yet at the same time, nurses expressed concerns about being distracted, "oftentimes you're looking at the equipment or the numbers or the devices, and the patient is second." Nurses were very much aware of the mechanical versus humanistic potential when technological devices were used and spoke of devices as a tool. As one nurse stated:

> If you have a tool and you know how to use it properly it can do wonderful things for you. But the whole art of nursing is based on human connection. So I think as long as we keep that in mind we won't lose the human connection that you need to have with nursing. So it'll just be another tool.

Both patients and nurses were asked about what happened when a device alarm occurred. Responses were collated into three categories: irritation or annoyance, anxiety, or helpful. Patients or nurses in acute care or progressive care settings most often described reactions of irritation or annoyance. Patients described sounds as an interruption to care and alarms as a "bother" for the nurse. Nurses described the irritation patients expressed at the plethora of sounds produced by devices, particularly IV pumps, bed alarms, cell phones and indicated patients were most sensitive to the sounds at night. Each developed strategies to deal with the sounds. Patients "learned to restart" or how to silence IV pumps alarms by observing the actions of the nurse. Patients set boundaries on cell phone use – one patient stated the phone could not be brought into the room. Nursing strategies included lowering the device volume, setting cell phones to vibrate, or leaving the phone outside the room or with a colleague.

Intensive care unit (ICU) nurses described how families spent time watching the bedside monitors. This resonates with Sandelowski's (2000) statement that we have now

moved into the "world of the screen" (pg. 135), but screen watching encompassed not just the provider, but also the patient and/or family. The occurrence of screen watching by the family or patient further substantiates the observations of Pearce et al. (2008, 2009, 2011) that technological devices influence interactions passively or actively. Intensive care unit nurses shared the anxiety produced in families when alarms sounded, as families often associated an alarm as "something bad has happened." Nurses stated this effect required extensive reassurance and explanation about the purpose of the device or alarm, often taking time away from patient care.

Finally, both patients and nurses described alarms as a helpful. Setting appropriate device parameters alerted nurses to needed interventions and allowed for a timely response. Patients felt nurse responses to alarms were to "make sure I'm in good shape."

Patients did not speak of generational differences in device use, whereas a third of nurses did. Nurses described how technology was operationalized and integrated into patient care based on what was perceived as generational or age differences and familiarity with technology. The six nurses who felt "older nurses aren't used to the new technology" ranged in age from 23 to 37, whereas one 43 year old nurse expressed a concern the "younger generation uses it...and doesn't talk to the patient enough."

In earlier analysis, there was no difference in Technological Competency as Caring in Nursing Instrument (TCCNI) scores based on age. To determine if age differences were manifested in TCCNI scores based on individual items, group differences were examined for each item. There were significant group differences between age categories and scores on item five: "Caring is engaging in compassion, physical presence, comforting, and respecting the whole person" (Locsin, 1999). Group

differences were significant, $F(3,108) = 3.91$, $p = .001$, Levene's HOV, $p = .773$. Since group sizes were divergent, *post hoc* analysis via Hochberg's GT2 was run. *Post hoc* analysis indicated nurses aged 50 and above had significantly lower mean scores ($M = 85.09$, $SD = 2.01$) than nurses aged 30-39 ($M = 92.61$, $SD = 1.04$, $p = .007$) and nurses aged 20-29 ($M = 92.15$, $SD = 1.05$, $p = .014$), but no significant differences with nurses aged 40-49 ($M = 91.65$, $SD = 1.49$, $p = .058$).

Items specifically referencing technology, which perhaps would produce greater differences if age were a factor, were reviewed. Group differences were examined using one-way Analysis of Variance. Results were non-significant for all items.

Table 17

TCCNI Technology Items Referenced to Age

	TCCNI item 2	TCCNI item 6	TCCNI item 10	TCCNI item 13	TCCNI item 24	TCCNI item 25
Categorized age	$p = .823$	$p = .608$	$p = .358$	$p = .578$	$p = .131$	$p = .301$

Therefore, although comments were made by nurse participants suggesting challenges existed for older nurses with technology and technological device usage, age differences were not substantiated by quantitative data.

The qualitative global themes of safety, learning, and balance and subthemes of operationalization skill, operational learning, and observation/explanation were organized into the following statement and figure:

> Technology and technological device use was viewed by both patients and nurses as a positive, safety focused occurrence in healthcare delivery. Patients appreciated how devices streamlined care and nurses appreciated how devices allowed for rapid and complete access and response to data. However, patients

perceived devices as allowing for greater efficiencies and treatment effectiveness, whereas nurses reflected on the learning, maintenance, and troubleshooting devices required. Both patients and nurses observed how the user operationalized the technology and device into care. Patients viewed operationalization as a measure of competence; nurses viewed operationalization and integration of devices as a skill requiring an ongoing balance.

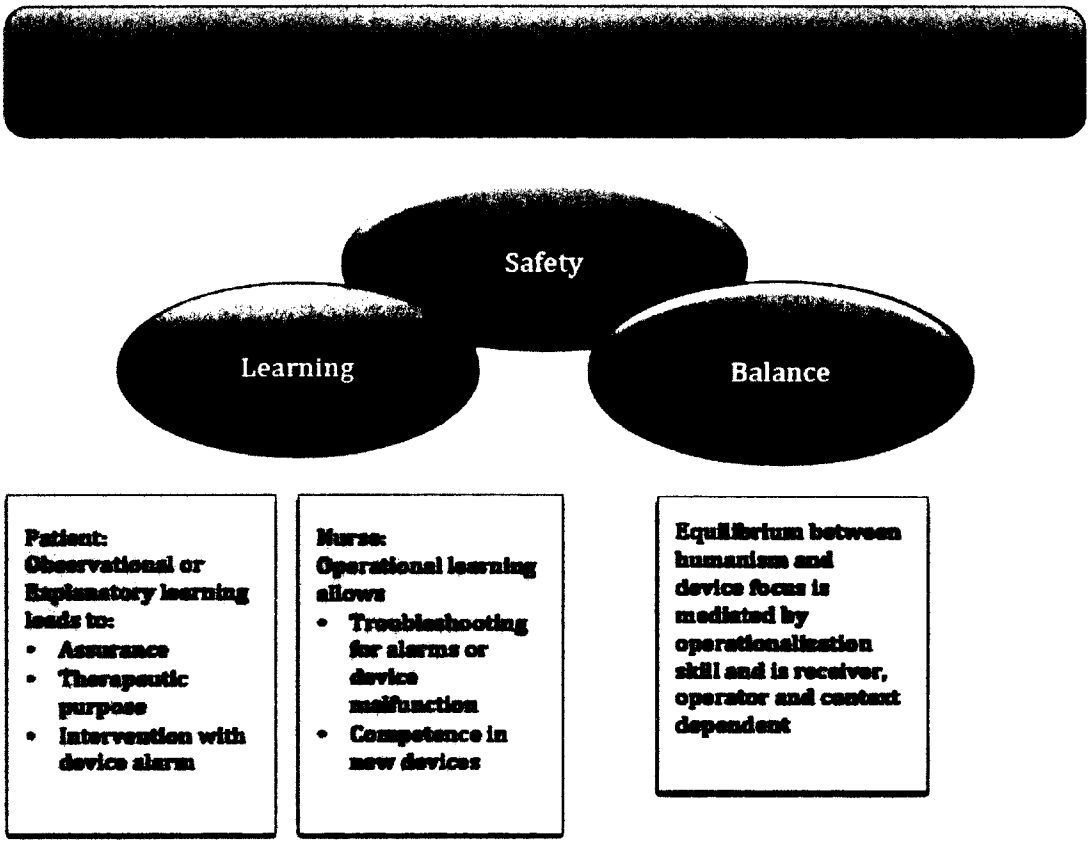

Figure 4. Qualitative Themes

Instrument analysis

Reliability statistics were conducted for the three quantitative instruments used in the study and are listed in the table below.

Table 18

Reliability Statistics for Instruments

	n	Number of items	Cronbach's α
TCCNI	112	25	.886
CBI overall	87	24	.958
CBI: Assurance of human presence	87	8	.900
CBI: Professional knowledge and skill	87	5	.788
CBI: Respectful deference to others	87	6	.911
CBI: Positive connectedness	87	5	.853
PONS	87	25	.953

Nonparametric correlations were conducted between and within instruments. The PONS included two items that measured patient satisfaction with care. Responses on a 5-point Likert scale (very dissatisfied, dissatisfied, neither satisfied or dissatisfied, satisfied, very satisfied) to both items indicated high patient satisfaction and were significantly correlated with overall PONS scores.

Table 19

Satisfaction Scores and Correlation with Overall PONS Score

	n	*M* (*SD*)	r_s (85)
Satisfaction with care by <u>these</u> nurses	87	4.84 (.370)	.458**
Satisfaction with care by <u>all</u> nurses	87	4.75 (.554)	.434**

** $p < .001$

A secondary interest of the study was to determine if further clarification could be added to the discourse about caring and presence and if they are overlapping constructs. Initial scatterplots indicated a positive linear relationship between PONS results and all CBI and CBI subscale results. All correlations were significant at $p < .001$. Correlation results indicate a very strong positive correlation between nurse presence as measured by the PONS and overall caring behaviors as measured by the CBI-24. CBI subscales most strongly correlated with nurse presence were positive connectedness and assurance of human presence.

Table 20

*Spearman's rho Correlations between Instruments and Subscales**

	PONS	CBI overall	Assurance subscale	Knowledge & Skill subscale	Respectful subscale
PONS	-				
CBI overall	.827	-			
Subscale assurance of human presence	.760	.900	-		
Subscale professional knowledge & skill	.687	.822	.729	-	
Subscale respectful deference to others	.713	.900	.741	.673	-
Subscale positive connectedness	.761	.940	.783	.713	.850

* all results $p < .001$, $df(85)$

CHAPTER V

DISCUSSION OF FINDINGS

The overall purpose of this study was to explore the patient's perceptions of nurse caring and presence when technological devices were used in care delivery in the acute care setting. To achieve that aim, three research questions were posed and analyzed. The conceptual model guiding the study included three grand theories: nursing as caring, humanistic nursing, and human caring science. Three mid-range theories (derived from the grand theories) provided the attributes that were measured: technological competency as caring, caring, and nurse presence. This chapter will provide a discussion of the findings and implications for nursing practice, education, research, and policy.

Study Summary

Data was prospectively collected in a mixed methods approach from both patients and nurse participants utilizing quantitative instruments and qualitative interviews in early to mid-2014 at an adult acute care hospital in the southwestern United States. Nurses completed the Technological Competency as Caring in Nursing Instrument (TCCNI) and patients completed the Caring Behaviors Inventory-24 (CBI-24) and the

Presence of Nursing Scale (PONS). Focused, semi-structured interviews were conducted with a smaller subset of participants.

Quantitative analysis included 112 nurses and 115 patients; qualitative analysis was a subset of the participants in the quantitative study and included 23 nurses and 15 patients. Nurses were predominantly female (83.9%), self-identified their race as White (56.3%) or Asian (29.5%), and had a bachelor's degree in nursing (80.2%). The mean age was 34.9 (*SD* 9.44) and ranged from 22 to 65 years. Years of nursing experience ranged from 0.4 to 44 with a median of 6.0 years. The mean score on the Technological Competency as Caring in Nursing Instrument was 82.72 (*SD* 7.56). No significant differences in technological competency scores were found for any demographic variables other than self-reported race.

Analytic results in this study differed from Locsin's (1999) report in which education, years of experience, and area of practice (critical care or non-critical care) influenced TCCNI scores. Participant samples between the two studies were compared. The nurse participants in the current study had twice as many bachelor's degree or higher (84.7% versus 40.9%), included practicing inpatient clinicians only (Locsin included outpatient and administration areas) and the largest subgroup had 0-5 years of experience (49.1%) compared to Locsin's largest subgroup which had 6-10 years of experience (28.5%). Locsin reported results from 193 nurses; this study analyzed results from 87 nurses – it is surmised the differences in participant sample size and demographics explains the variance in results. Locsin did not report on race and recommended ethnicity be studied to further examine the reliability and validity of the TCCNI.

Race in this study produced significant differences in TCCNI scores. Asians had higher mean TCCNI scores, but also had the largest proportion in two categories reflecting nursing experience. Asians had the largest proportion in six to ten years of nursing experience and in six to ten years of years of experience in a current practice area. It is surmised Asians overall scores were higher due to these greater years of experience, and scores were perhaps reflective of more competence or confidence in practice based on experience.

In nurse participant interviews, views of technological device in care delivery revealed the predominant themes of safety, learning, and balance. Nurses were very cognizant of the positive effects of technological devices (safety), but also very mindful of the balance they felt needed to be maintained between device use and interpersonal, relational exchanges with the patient and family. Devices were definitely a presence, or actant, in care delivery as previous researchers noted (Almerud et al., 2008; Pearce et al., 2008, 2009. 2011). No interviewee described the devices as creating an inhumane environment as relayed by Hawley and Jensen (2007), but perhaps because the nurses were so aware of how operationalization of the devices could enhance or impede relational interactions. Another explanation could be the greater influx of device use, even since 2007, has made technology a ubiquitous feature of the clinical environment and therefore integration of its use into care delivery processes not as foreign. Many nurses spoke of how they used or included the device (EHR, monitor, medication barcode) into educational interchanges with patients and families. These methods were indicative of using devices in a triadic relational style (nurse, patient/family, device), a

strategy noted in research previously conducted in general medical practices (Pearce et al., 2008, 2009, 2011).

Nurses conveyed a negative view of technological devices in two instances. First, device malfunction was disruptive to care as previously reported by Wikström et al., (2007) and Haghenbeck (2004) and required troubleshooting by clinicians. Second, introduction of new devices into the clinical setting required mastery or, as Ray (1987) noted, proficiency with the device. Device malfunction and a perceived lack of competence produced frustration for the nurses. Interviewees reported tactics required to learn new devices (even after formal education had been received) or fix device malfunctions could shift the focus from the patient to the equipment. As Barnard (1997, 1999, 2002, 2007) reported, technology is not neutral, often requires an active response, and consequently influences nursing workflow and practice.

Patient participants were male (55.7%) more than female (44.3%), White (70.4%), older adult (mean age 59.6 years), and educated at the college (49.6%) or post-graduate (22.6%) level. Patients' perceptions of caring or nurse presence had high mean scores on the Caring Behaviors Inventory-24 (CBI $M = 5.44$) and Presence of Nursing Scale (PONS $M = 115.82$) similar to those reported by Merrill et al. (2012) and Hansbrough (2011). Subscale scores were highest for the professional knowledge and skills scale of the CBI ($M = 5.53$), a result congruent with a large European study (Papastavrou et al., 2011).

There were only a few patient demographic variables that explained significant differences in scores – gender, pain, and age. Gender revealed significant differences in CBI scores: males rated overall caring, assurance of human presence, and positive

connectedness higher than females. Prior reports of gender differences in patient ratings of caring behaviors have been inconsistent. Merrill et al. (2012) reported differences in items on the CBI-42 based on gender; whereas Wolf et al. (2003) and Poirier and Sossong (2010) reported no gender differences. Physiologic factors also influenced scores – patients who were in pain had significantly lower scores on the positive connectedness subscale of the CBI-24. Although gender and pain were significant for explaining differences in caring scores, gender accounted for only minimal variance (7%) in CBI scores. Patients who were older reported higher perceptions of nurse presence as measured by the PONS with age explaining 8.7% of variance in PONS scores. Finally, patient satisfaction had a strong positive correlation with nurse presence scores, consistent with the results of Hansbrough (2011). Results from this study add to potential differences in patient perceptions of caring and nurse presence based on demographic factors.

Patient participant interviews on technological device use were congruent with the themes of safety and learning expressed by nurses. Patients felt devices provided a safety oversight, particularly with medication barcoding, and had strong positive comments about technology when used in that manner. Almerud et al. (2007) found the same safety theme in interviews with Swedish patients.

The perception of therapeutic purpose or result could be positive or negative. Views on device connection were positive if the device produced the intended result, but negative if the device was not explained or operationalized to the patient's satisfaction. Lapum et al. (2010) reported patients spoke of being fixed by technology – a positive therapeutic result. This theme resonated with one patient's statement about a device:

"thanks to that I'm still here." On the opposite spectrum, patients' negative views of technological devices were often based on how the device was used by the operator, a view which again was previously reflected in patient interviews conducted by Lapum et al. (2010). If the patient felt the operator was "not concerned" or provided "no explanation – they just shoved" then the operator, and by extension, the device and therapeutic purpose was viewed negatively. As Barnard and Sandelowski (2001) affirmed: the use of technology is operator, receiver, and context dependent and governs whether technology is viewed as a dehumanizing or humane adjunct to care.

Patient learning about device purpose and device alarms was active (nurse explanation) or passive (observation); either method produced a patient response. With explanation, patients expressed greater comfort with the device and its intended purpose; with observation patients expressed the self-actualized learning which occurred and permitted them to be an active member in device use.

Active participation in device use was an unexpected finding. Patients learned via observation how to 'troubleshoot' devices, particularly intravenous alarms. When the intravenous pump alarmed, most patients reported the quick response of the nurse, but a third of the interviewees shared how they addressed the alarm – by silencing the alarm, restarting the pump, or repositioning their arm. Implications for this finding will be addressed later in the chapter.

Caring and Presence

A secondary goal of this research was to determine if the concepts of caring and presence could be further distinguished. As Finfgeld-Connett (2008a) noted in a qualitative comparison, these two concepts have been extensively discussed in nursing

literature, but are often indistinguishable. The results of this study provided a direct comparison of nurse caring and nurse presence from the patient's perspective by use of two formal instruments.

First, overall scores on the two instruments (CBI-24 and PONS) were markedly high. The CBI-24 was measured on a 1-6 point Likert scale, and the composite mean score was 5.44. Additionally, CBI scores were negatively skewed, indicating patient respondents highly rated nurse caring behaviors. The 25-item PONS was measured on a 1-5 point Likert scale, (minimum score 25, maximum score 125) and the aggregate mean score was 115.82. Again, scores on this instrument were negatively skewed, indicating patients rated nurse presence consistently high.

Correlational comparisons were performed. Correlation results were all significant at $p < .001$ and ranged from r_s .687 to .827. Results indicated a substantial, positive relationship between the two concepts. In reviewing subscales of the CBI-24, the PONS had the lowest correlation with the professional knowledge and skill subscale of the CBI-24. This is not surprising, as this subscale has been interpreted as how patients view the technical skills of the nurse, rather than the affective skills (Baldursdottir & Jonsdottir, 2002). The PONS had the largest and almost identical correlations with the positive connectedness ($r_s = .761$) and assurance of human presence subscales ($r_s = .760$), measures of affective domain.

The results of this study do not further distinguish caring and presence behaviors, at least from the patient's perspective. However, as was previously described, many patients were challenged with some of the items on the scales and perhaps results would have been different with a larger sample of completed instruments.

Results Integrated into Conceptual Model

The conceptual model guiding the study was derived from three grand theories and three mid-range theories. The conceptual model proposed the nurse-patient relationship occurred in a dynamic environment where technological competency as caring exhibited by the nurse influenced patient perceptions of caring and presence. Therefore, the operational attributes measured were technological competency as caring, nurse caring, and nurse presence.

All attributes received high mean scores on their respective instruments. Nurses reported a high degree of technological competency as measured quantitatively. Only when qualitative interviews were conducted did perceived challenges with operationalization of technological devices arise. The nurses, however, displayed resiliency with use of machines and developed strategies on how to integrate devices into care delivery. All expressed an awareness of how the devices were or might be perceived by the patient or family. Measures were taken to mitigate behaviors associated with machine use, either by explaining the purpose of the device, using the device as an instructional aide, or a heightening awareness to avoid 'screen viewing' to the exclusion of patient interaction.

Locsin in his mid-range theory of technological competency as caring (Parcells & Locsin, 2011), posited technology can allow the nurse to get to know the patient more fully and as a 'whole' person. Although nurse interviewees did not express the data derived from technological devices specifically in those terms, one participant shared "I use that [referring to the EHR] as a tool to get to know them before I meet them…I can

really research everything about them." This statement supports Locsin's assumption that technology can be used to know persons.

Patients reported an overall high degree of caring and presence behaviors. Patients or nurses did not express their interpersonal interactions in the previously listed presence descriptors (domains, levels, phases, modes), but something more germane to them. Presence has been described by Kostovich (2012) as a 'connectedness' that can occur between patient and caregiver. Two patients shared stories after formal interview questions were answered about how their interactions, their connections, with caregivers were transformational.

The first patient initially "felt like I wasn't getting what I needed...and I was starting to get frustrated." She shared her frustration with an ancillary staff member who told the nurse. The patient then relayed "she (RN) came back in and things started rolling." What was significant for the patient was the interaction she had the following day with the nurse who shared her personal vulnerability about being "completely overloaded" and her inner dialogue questioning if she still wanted to be a nurse. The nurse concluded she did and the patient, through her tears said:

> She really touched me...she said she was going to do everything she could to help me. And from then on she was right there and watching everyone else who was taking care of me too. You know it started off kind of a bad thing into a wonderful thing. And that is how I think of nurses. Like they really do care.

The second patient had a more extensive recovery and wanted to share her insights about the relationships she developed with a variety of providers.

> It's been very rewarding on both sides...the encouragement of all the staff...it's restorative...they've given me the reassurance that what's happening to me happens every day in this hospital, that it's normal. I think the RNs are highly skilled and very in tune with our bodies, but I feel the LVNs, the CNAs...are the comfort givers and the soul touchers. They take me on as a person...it's just a comfort to get that connection and that caring.

Although this study focused on the relationships between nurses and patients, any provider has the opportunity to convey caring and presence, if they so choose.

Patients only expressed dissatisfaction with nursing care when they felt attention was diverted from their care by interruptions. A key complaint referenced the cell phone carried by the nurse. Again, nurses attempted to mitigate the disruptions caused by cell phones, but patients endeavored to take control by instructing the nurse to leave the phone outside the room or not work with the patient unless they had scheduled an uninterrupted block of time. Henderson et al. (2007) in a review of caring behaviors noted a negative behavior perceived by patients was one termed "nurse forgetfulness" (p. 150). Interruptions and disruptions caused by cell phone usage could be considered nurse forgetfulness as Swanson's (1993) mid-range theory elements of attentiveness, "doing for," and "being with" divert the nurse from the patient when responding to the phone. The study organization is one which subscribes to patient-centered care and has Planetree® designation, so it would be interesting to research if patients would feel as empowered to set boundaries in organizations which did not practice or advertise a patient-centered focus.

Nursing Implications

Nursing Practice

Technological devices may be assistive equipment in the care delivery process, but the noise they produce (either alarm or notification) can be disruptive to the patient and provider. Alarms appropriately, but also inappropriately, take attention away from the patient. Appropriate alarms are seen as a safety net, whereas inappropriate alarms due to device malfunction produce frustration and annoyance for patients and providers. In either instance, a timely response to alarms is warranted. Patient and family reaction to alarms is mitigated by how they observe the provider reacts to the alarm. Nurses view cell phones as a necessity for communication, but patients expressed annoyance when the attention of the nurse was diverted from their care to answer a call. Some nurses devised strategies to moderate phone interruptions, such as changing the phone to vibrate or leaving the phone with a colleague. All providers can adopt these measures, particularly during times when attention should be firmly focused on the patient. Attentiveness and connectedness were key elements in patient interviews and providers can make a clear choice whether to engage or disengage in interactions.

Prior studies have shown a positive relationship between patient satisfaction scores and CBI-24 scores (overall and positive connectedness subscale) or PONS scores (Kostovich, 2012; Palese et al., 2011; Wolf, et al., 2003). A focus of nursing practice could address pain relief. Patients in pain comprised 39% of the sample and thus impacted the positive connectedness subscale score. This subscale had the lowest mean score (5.16) and therefore may have implications not only for pain management, but overall patient satisfaction. Pain relief is a basic fundamental of care (Kitson et al., 2010),

a key concept for nursing in providing holistic and patient-centered care. When pain, either physical or psychological, is not addressed or inadequately addressed, the patient's experience and expectation of caring and nurse presence, and thus satisfaction, is compromised.

Nursing staff also should be aware of patient intercession with technological devices, particularly as it relates to alarm management. The device most often manipulated by patients (per their report) was the intravenous pump. Patients expressed notable observation skills and learned how to manipulate the pumps by mimicking nurse behaviors. Unfortunately, this can have untoward adverse effects and nursing staff must address these actions.

Nursing Education

Results from this study have implications not only for education provided in the clinical setting, but also in the academic setting. Nurse and patient interviewees expressed the need for relevant clinical on the job training with new technological devices in the "live" environment, not just in pre-launch skill stations or class environments. Nursing workflow is often modified when new technologies are introduced, and changes to the workflow may be difficult to foresee or simulate in a controlled training environment. Trainers thus may need to be present to support provider learning in the clinical setting when alterations to workflow, or device malfunction, occurs in real time.

Condon (2013) and Diener and Hobbs (2012) have expressed the challenges in teaching the interpersonal attributes of caring and presence in an academic environment. The current state of nursing education is also technology heavy, incorporating a variety of teaching methodologies such as low to high fidelity patient simulation, distance

education, and virtual environments. Both expressed a concern that teaching or role modeling the interpersonal skills of caring and presence, or "being with" as described by Paterson and Zderad (1976, p. 14) and "dwelling with" as described and Johns (2013, p. 153) are challenging without face-to-face, interactional exchanges.

Research and Policy

The Joint Commission (The Joint Commission, 2014) mandates national patient safety goals and goal number six for hospitals for 2014 is to "improve the safety of clinical alarm systems." Addressing alarm fatigue and alarm burden, two untoward events impacting alarm safety, has been a matter of national policy and ongoing research. Thus far the research and policy focus has been on addressing provider interventions and responses (Funk, Clark, Bauld, Ott, & Cross, 2014). An unexpected finding from this study is patient self-described interventions with alarms. This may indicate alarm burden is not just an issue for healthcare providers, but also for patients. Research should be extended into how patients and families view and intervene with alarms, as any organizational or provider safety measures put in place may be compromised by patient interventions.

The item with the lowest mean score on the TCCNI was item 5: "Caring is engaging in compassion, physical presence, comforting, and respecting the whole person" (Locsin, 1999). Nurses who were aged 50 and above scored this item significantly lower than the youngest nurses. A focus of further study could be to determine if there is a relationship between compassion fatigue and the low scores on this item, particularly for older nurses.

There may be an opportunity to further analyze items on the CBI-24 and the PONS. Some patients found some items difficult to answer ("I don't know what this means" / "I can't answer this"), and yet the more education reported by the patient, the greater number of non-answered items. This brings up an interesting area of possible future investigation – were some items too abstruse and other items too ambiguous? The Caring Behaviors Inventory has undergone many revisions, and currently a six-item instrument exists; perhaps the shorter instrument would have had a higher completion rate. The Presence of Nursing Scale is a relatively new instrument and there may be an opportunity to refine some items.

If the discourse about caring and presence similarities or differences continues in nursing research and literature, this study indicates there are many correlated items between the two concepts. Although nurse scientists may believe there are distinct differences, patients either in quantitative responses or qualitative interviews did not distinguish between the two constructs. Further research into patient, rather than nurse, perceptions of presence and caring as similar or distinct concepts may clarify or abate further dialogue.

Study Strengths and Limitations

Results from this study may not be generalizable to other organizations. Participant sampling was done by convenience and therefore might not have captured those respondents who would score behaviors differently than the current sample. The study was conducted in a single organization in the southwestern United States and results might not be similar in organizations which have different nurse and patient demographics. Nurse participants for interviews, in particular, were self-selected and may

have had opinions on technology they specifically wished to convey. Although 23 nurses were interviewed (greater than the originally anticipated 15), an additional five nurses volunteered for interviews, but their views were not captured. Additionally the study organization has American Nurses Credentialing Center Magnet® and Planetree Designated® Patient-Centered Hospital recognition, which may imbue the nursing staff with behaviors which are more congruent with those espoused by patient-centered care.

The requisite patient sample size was achieved, however a notable number of patients did not answer all items on the CBI-24 and/or the PONS. Twenty four percent of patients did not complete all items on either or both instruments. This impacted the data available for analysis, and thus may have influenced quantitative results. Additionally, although some patients either verbally or in writing shared their reasons for not answering specific items, it is unknown if patients did not respond because they did not want to share negative feedback. The impact of the non-response bias on quantitative analysis is unknown. Interestingly, four of the 28 patients who did not answer all items on the quantitative instruments volunteered and participated in qualitative interviews.

Despite these limitations, this study does indicate patient perceptions of caring and nurse presence are influenced by gender, pain, and age and therefore provide an opportunity for nurses and other healthcare practitioners to individualize care. Additionally patient satisfaction can be influenced by caring and presence behaviors. It is still the interpersonal, relational skills of the caregiver, rather than the technologies and devices used in care delivery, which are important factors in how patients view their overall healthcare experience.

Conclusion

This study shows nurses and patients rated the attributes of technological competency as caring, nurse caring, and nurse presence high. Technological competency as caring scores were universally high and only affected by race. Asian nurses reported the highest mean scores on the TCCNI and also had the greatest proportion in the 6-10 years of experience group. Patient perceptions of caring behaviors were rated between almost always to always on the CBI-24 with scores significantly higher for male patients and patients not in pain. Patient perceptions of nurse presence were rated as occurring frequently to always and were significantly correlated with patient age – as age increased, patient perception of nurse presence increased. Nurse and patient reflections on technological device use included the themes of safety, learning, and balance. The increased use of technology in the acute care setting is an active presence which influenced care delivery, yet providers in this study were aware of this potential and concurred and subscribed to Turkle's observation (2011): "Technologies, in every generation, present opportunities to reflect on our values and direction." (p.19).

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Appendix A

Registered Nurse Demographic Form

The purpose of this questionnaire is to collect demographic information about participants in the study. All responses are anonymous and will be reported in the aggregate only. Please carefully read and answer each question.

1. What is your age? _____

2. Please indicate your gender:
   ☐ Male ☐Female

3. Are you Hispanic or Latino?
   ☐Yes ☐No

4. Please indicate your race:
   ☐American Indian/Native Alaskan
   ☐Asian
   ☐Black/African American
   ☐Native Hawaiian/Pacific Islander
   ☐White
   ☐Two or more races
   ☐Other, please specify_____

5. What is your highest nursing degree?
   ☐Diploma
   ☐ADN
   ☐BSN
   ☐MSN
   ☐Doctorate in Nursing

6. How many years of nursing experience do you have? (enter in years 0.0)
   _____

7. What is your current practice area?
   ☐Surgical Intensive Care Unit
   ☐Medical Intensive Care Unit
   ☐Surgical Progressive Care
   ☐Medical Progressive Care
   ☐Medical Acute Care
   ☐Surgical Acute Care
   ☐Observational Unit
   ☐Rehabilitation Unit
   ☐Other, please specify _____

8. How many years of experience in your current practice area? (enter in years 0.0)

_____

Appendix B

Patient Demographic Form

The purpose of these questions is to collect some general information about participants in the study. All answers are confidential and will be reported as combined information only. Please carefully read and answer each question.

1. What is your age?
   _____

2. Please indicate your gender:
   - ☐Male
   - ☐Female

3. Are you Hispanic or Latino?
   - ☐Yes
   - ☐No

4. Please indicate your race:
   - ☐American Indian/Native Alaskan
   - ☐Asian
   - ☐Black/African American
   - ☐Native Hawaiian/Pacific Islander
   - ☐White
   - ☐Two or more races
   - ☐Other, please specify_____

5. What is your educational level?
   - ☐1-8 grade
   - ☐9-12 grade
   - ☐1-2 years of college
   - ☐3-4 years of college
   - ☐5 years or more of college

6. What is your highest degree earned?
   - ☐Associate
   - ☐Bachelor's
   - ☐Master's
   - ☐Doctorate

7. Number of admission to hospital or other healthcare setting in the past 5 years _____

8. Reason for current admission or need for healthcare services of nurse
   - ☐Medical
   - ☐Surgical
   - ☐Other:
     _____

9. Number of days in hospital during the last or current admission
   _____

10. Unit where received most nursing care?
    - ☐Surgical Intensive Care Unit
    - ☐Medical Intensive Care Unit
    - ☐Surgical Progressive Care
    - ☐Medical Progressive Care
    - ☐Medical Acute Care
    - ☐Surgical Acute Care
    - ☐Observational Unit
    - ☐Rehabilitation Unit
    - ☐Other, please specify

11. Are you currently in pain?

☐No

☐Yes

If yes, what is your pain level_____

Appendix C

From: Rozzano Locsin [mailto:locsin@fau.edu]
Sent: Saturday, March 02, 2013 10:02 AM
To: Belinda Toole
Subject: RE: Technological Competency as Caring in Nursing Instrument

Dear Ms. Toole,
Thank you very much for your interest in the TCCNI. Currently in analysis is the development of a 'short form'. Other than that, please feel free to use the instrument. I believe you are referring to the 25-item version published in the International Journal for Human Caring.
My only request is that you provide me with data/information about your usage of the instrument. I look forward to your success.
Thank you.

Dr. Locsin
ROZZANO C. LOCSIN, RN; PhD, FAAN
Professor of Nursing
Florida Atlantic University, Christine E. Lynn College of Nursing
777 Glades Road
Boca Raton, FL 33431-0991
tel: 561-297-2875; FAX: 561-297-2416
email: locsin@fau.edu
web: http://nursing.fau.edu

From: Belinda Toole [Belinda.Toole@sharp.com]
Sent: Saturday, March 02, 2013 12:16 PM
To: Rozzano Locsin
Cc: belindatoole@sandiego.edu
Subject: Technological Competency as Caring in Nursing Instrument

Dr. Locsin:
I am inquiring about the TCCNI instrument as I recently read your article about the development of the instrument. I am a PhD student at the University of San Diego and my dissertation interest is technological device use and patient's perception of caring and nurse presence.
I was very excited to find an instrument that addressed technology and caring and was hoping you could provide me with more information on it's use.
Has additional psychometric evaluation been done with nurses and patients?
Would you be willing to allow your instrument to be used and, if so, what is the associated cost?
Thank you for your consideration.

Belinda Toole, MSN, CCRN, CCNS
University of San Diego

Appendix D

From: **Zane Wolf**
Date: Thursday, August 1, 2013
Subject: CBI-24
To: Belinda Toole <belindatoole@sandiego.edu>

Dear Brenda:

Please see the attached version of the CBI and the release form.
There is no charge.

Best wishes,
Zane Wolf

Zane Robinson Wolf, PhD, RN, FAAN
Dean Emerita and Professor
School of Nursing and Health Sciences
La Salle University
Editor, International Journal for Human Caring
St. Benilde Tower 3330
1900 West Olney Avenue
Philadelphia, PA 19141
215 991 2273
215 991 2941 (Fax)
wolf@lasalle.edu

From: Belinda Toole [belindatoole@sandiego.edu]
Sent: Thursday, August 01, 2013 2:55 PM
To: Zane Wolf
Subject: CBI-24

Dr. Wolf:
I am a PhD student at the University of San Diego. My dissertation topic is studying patients perceptions of caring and nurse presence when technological devices are used in patient care. I was hoping to use the Caring Behaviors Inventory - 24 as an instrument in the study.

I am not sure if the use of the instrument is restricted. If it is not, would you allow the use of the CBI-24 and what is the associated cost?
Thank you for your consideration.

Belinda Toole, MSN, CCRN, CCNS
University of San Diego

Appendix E

From: **Kostovich, Carol** <ckostovich1@luc.edu>
Date: Tue, Aug 27, 2013 at 8:03 AM
Subject: RE: PONS instrument
To: Belinda Toole <belindatoole@sandiego.edu>

Hello Belinda,

My apologies for the delay in responding to your request.

Congratulations for arriving at the dissertation stage of your doctoral study! :)

You have my permission to use the Presence of Nursing Scale. There is no cost to use the instrument. I only ask that you keep me updated on your progress, share your findings with me and acknowledge me as the author in any publications or presentations. What population will you be studying?

I have attached the instrument. Please let me know if you have any questions, or if you need any assistance.
Best regards,
Carol

From: Belinda Toole <belindatoole@sandiego.edu>
Sent: Tuesday, August 27, 2013 9:49 AM
To: carol.kostovich@va.gov; Kostovich, Carol
Subject: PONS instrument

Dr. Kostovich:

I am a PhD student at the University of San Diego. My dissertation topic is patient perceptions of caring and nurse presence when technological devices are used in patient care. I was hoping to use your Presence of Nursing Scale instrument in the study.

I am not sure if the use of the instrument is restricted. If it is not, would you allow me to use the PONS and what is the associated cost?

Thank you for your consideration.

Belinda Toole, MSN, CCRN, CCNS
University of San Diego

Appendix G

131185
Toole
11/20/2013
8-5

Institutional Review Board
8695 Spectrum Center Blvd
San Diego, CA 92123
P (858) 499-4836 / F (858) 499-3105
http://sharpnet/irb/ www.sharp.com/research
E-mail: research@sharp.com

November 26, 2013

Belinda Toole, MSN, RN
Sharp Memorial Hospital
7901 Frost Street
San Diego, CA 92123

RE: IRB #131185
Patient Care Technology and the Nurse-Patient Relationship

Dear Ms. Toole:

The Sharp HealthCare Institutional Review Board (IRB00000920; FWA00000084) has reviewed and approved your application for the above-referenced research activity in accordance with 45 CFR 46.110(b)(1), Categories 6 and 7. This approval includes:

- Research Narrative (20Oct2013)
- Recruitment Flyer (Rev05Nov2013)
- Waiver of authorization allowed for patient participants per 45 CFR 164.512(I)(2)
- Appendix H: Introductory Consent Letter - Nurses (20Oct2013)
- Appendix I: Introductory Consent Letter - RNs w/Interview (20Oct2013)
- Appendix J: Introductory Consent Letter - Patients (20Oct2013)
- Appendix K: Introductory Consent Letter - Patients w/Interview (20Oct2013)
- Waiver of signed consent allowed for employee and patient participants per 45 CFR 46.117©(1-2)
- Appendix A: Registered Nurse Demographic Form (Rev05Nov2013)
- Appendix B: Patient Demographic Form (Rev05Nov2013)
- Appendix C: Technological Competency as Caring in Nursing Instrument © (Rev05Nov2013)
- Appendix D: Caring Behaviors Inventory - 24 (Copyright © Zane Robinson Wolf. 1981; 1990; 1991; 10/91; 1/92; 3/92; 8/94; 12/95)
- Appendix E: Presence of Nursing Scale (Rev05Nov2013)
- Appendix F: Semi-structured Interview Questions (Rev05Nov2013)

This action will be reported to all committee members at the November 20, 2013 meeting.

The following site(s) and site personnel are approved:

Site: Memorial

Principal Investigator: Belinda Toole, MSN, RN

Study Coordinator: None

Sub-investigator and Other Site Personnel: None

The IRB reference number is 131185. Please include this reference number in all future correspondence relative to this research activity.

As a reminder, it is the responsibility of the Principal Investigator to submit periodic status reports to the IRB. Periodic review of this research activity may be conducted via an expedited process and is scheduled for inclusion on the October 15, 2014 IRB meeting agenda. Approval for this research activity will expire if periodic review is not conducted on or before November 5, 2014. Please provide a completed Continuation Request with required supporting documentation to [redacted] no later than September 30, 2014 to ensure timely review and continuation of this research activity.

Changes or amendments to the research activity protocol, informed consent documents, and to other research activity-related documents, as well as new documents, tools or advertisements to be utilized as part of this research activity, must be reviewed and approved by the IRB before changes are implemented.

It is the policy of Sharp HealthCare IRB that the investigator(s) submit a copy of any abstracts, papers, manuscripts, posters, presentations, articles, etc. to the IRB prior to publication or dissemination. Sharp HealthCare would expect that if the results of the research project came to publication, their role would be properly recognized in the research or have the opportunity to have the organization's name withheld. This also gives the organization the opportunity to prevent disclosure of data or information that is beyond the scope of the research agreement.

Thank you and please feel free to contact me at (858) 499-4836, if you have any questions.

Sincerely,

Caryn L. Burgess, CIP
IRB Specialist

Enc.