Testing Peplau's Theory of Interpersonal Relations in Nursing Using Data from Patient Experience Surveys

Thomas Arthur Hagerty
Graduate Center, City University of New York

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Testing Peplau’s Theory of Interpersonal Relations in Nursing

Using Data from Patient Experience Surveys

by

Thomas A. Hagerty

A dissertation submitted to the Graduate Faculty in Nursing in partial fulfillment of the requirements for the degree of Doctor of Philosophy, City University of New York

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of the dissertation requirements for the Degree of Doctor of Philosophy

_______________________                                     ______________________________________
Date                                                                        Margaret Lunney, RN, PhD
Chair of Examining Committee

_______________________                                     ______________________________________
Date                                                                         Donna Nickitas, RN, PhD, FAAN
Executive Officer

Eileen Gigliotti, RN, PhD
Donna Nickitas, RN, PhD, FAAN
Hussein Tahan, RN, PhD
William Gallo, PhD
Supervisory Committee

THE CITY UNIVERSITY OF NEW YORK

_________________________________________
(Margaret Lunney, Sponsor)

_________________________________________
Date
Abstract
Testing Peplau’s Theory of Interpersonal Relations in Nursing
Using Data from Patient Experience Surveys

By Thomas A. Hagerty

Sponsor: Professor Emerita Margaret Lunney

Patients’ experiences in hospitals are important indicators of quality. Patients’ opinions about their experiences in hospitals are significantly associated with their opinions of those hospitals’ nursing services. Nurses in the US have traditionally focused on patients’ experiences, and Peplau’s (1952/1991) theory of interpersonal relations is early evidence of that focus. This study tested Peplau’s (1952/1991) theory of interpersonal relations in nursing using confirmatory factor analysis (CFA) on data from 12,436 patient experience surveys. Two hypotheses were supported: (a) patient experience data (i.e. responses on the Consumer Assessment of Healthcare Providers and Systems - Hospital [HCAHPS] survey) collected from patients in one large, academic hospital system during the year 2013 showed a good fit to a two-factor model based on Peplau’s (1952/1991) theory and (b) these same data showed an excellent fit to the original latent factors established by the Centers for Medicare and Medicaid (CMS). One hypothesis was not supported: the two-factor model based on Peplau’s (1952/1991) theory was not comparable to the original HCAHPS factor structure produced with the same data. Data from the CFA indicated adjustments to the proposed two factor model, and ancillary analyses of a three factor model were conducted using the same patient-experience data and the same CFA methods. The more theoretically accurate three-factor model was an excellent fit to the data and, in generalized linear regressions, made significant contributions to prediction of patients’ overall evaluations of their hospital experiences. The research supports that hospital leaders should: (a) assist
nurses to assume greater ownership of elements measured by the HCAHPS survey and (b) provide supportive environments for nurses to allow for this expanded practice.
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Dedication

This dissertation is dedicated to Brenda Witherall, RN.

She took me under her wing at the beginning of my career and taught me what it truly means to be a nurse. I will always remember and be grateful for her examples of patient-centeredness, clinical judgment, and common sense.
# Table of Contents

Abstract ........................................................................................................................................ iii

Chapter I. The Research Objective ............................................................................................. 1

The Problem .................................................................................................................................. 2
Definitions ..................................................................................................................................... 4
Delimitations ................................................................................................................................. 5
Theoretical Framework .................................................................................................................. 6
  Orientation phase ......................................................................................................................... 7
  Working phase ............................................................................................................................ 8
  Termination phase ...................................................................................................................... 8
  Integration .................................................................................................................................. 9
  Middle-Range theory propositions ............................................................................................ 9
Hypotheses ...................................................................................................................................... 12
Need for the Study ........................................................................................................................ 13

Chapter II. Review of the Literature ............................................................................................ 16

The Working Phase of Peplau’s Theory of Interpersonal Relations ........................................... 17
  Nurse-patient communication ..................................................................................................... 21
  Responsiveness .......................................................................................................................... 24
  Physical environment ................................................................................................................ 28
  Pain control ............................................................................................................................... 31
  Medication communication ....................................................................................................... 33
The Termination Phase of Peplau’s Theory of Interpersonal Relations ........................................ 34
  Discharge information ............................................................................................................... 36
Patients’ Overall Perceptions about Their Hospital Care ............................................................ 39
  Hospitalized patients' satisfaction with care .......................................................................... 43
Summary ....................................................................................................................................... 43

Chapter III. The Method ............................................................................................................. 45

Design .......................................................................................................................................... 45
Instrument ...................................................................................................................................... 47
Data Collection Procedures ......................................................................................................... 49
Data Preparation and Analysis ..................................................................................................... 50

Chapter IV. The Results .............................................................................................................. 53

Data Collection ............................................................................................................................. 53
  Missing Data .............................................................................................................................. 55
Sample Characteristics ................................................................................................................ 59
  Age ........................................................................................................................................... 59
  Sex ............................................................................................................................................ 61
Length of stay and admission through the emergency department ................................. 61
Race & ethnicity ........................................................................................................... 62
Language at home ........................................................................................................ 64
Educational level ........................................................................................................... 65
Perceptions about physical and mental health ................................................................. 67
Deleted cases ............................................................................................................... 68
Distribution and Reliability of the Data ......................................................................... 70
Distribution ................................................................................................................... 70
Reliability ....................................................................................................................... 70
Main Analysis .............................................................................................................. 73
Hypothesis 1a ................................................................................................................. 74
Hypothesis 1b ................................................................................................................. 77
Hypothesis 1c ................................................................................................................. 79
Ancillary Analysis ......................................................................................................... 80
Reasons to test the three-factor model .......................................................................... 80
Testing the three-factor model ...................................................................................... 82
Three-factor model and patients’ overall hospital ratings .............................................. 85
Three-factor model and patients’ likelihood to recommend .......................................... 87

Chapter V. Discussion .................................................................................................. 90
The sample characteristics ............................................................................................ 90
Psychometric Evaluation of the HCAHPS Survey ......................................................... 91
Model Goodness of Fit .................................................................................................. 93
Research Hypotheses .................................................................................................... 94
Ancillary Data Findings ................................................................................................ 96
Generalized linear models ............................................................................................. 97
Theoretical Framework .................................................................................................. 99

Chapter VI. Conclusions, Implications, and Recommendations ................................. 102

Conclusions .................................................................................................................. 102
Nursing Implications ..................................................................................................... 103
Implications for Practice ............................................................................................... 103
Implications for Education ............................................................................................ 104
Implications for Research .............................................................................................. 105
Recommendations .......................................................................................................... 106
Limitations ..................................................................................................................... 107

Appendices .................................................................................................................. 109
References .................................................................................................................... 114
List of Appendices

Appendix 1: HCAHPS survey ................................................................. 108

List of Figure and Tables

Figure 1.1: Peplau’s Framework: Major Concepts & Their Inter-Relationships ......................... 7
Figure 1.2: Conceptual-theoretical-empirical structure ....................................................... 10
Figure 1.3: Path Diagram of 15 HCAHPS items that correspond to Peplau’s phases ............. 11
Figure 4.1: CFA Peplau model ......................................................................................... 77
Figure 4.2: CFA Peplau model with three factors .............................................................. 85
Table 4.1: Rate of Return ................................................................................................. 55
Table 4.2: Missing data .................................................................................................... 57
Table 4.3: Frequency Table – Demographic variables ...................................................... 60
Table 4.4: Race and Ethnicity comparisons ...................................................................... 63
Table 4.5: Deleted Cases ................................................................................................. 69
Table 4.6: HCAHPS scores, medians, skewness and kurtosis ........................................... 71
Table 4.7: Reliability estimates for HCAHPS latent factors ............................................ 73
Table 4.8: Factor loadings for a CFA testing a model of HCAHPS items and Peplau’s theory ........................................................................................................................................ 76
Table 4.9: Factor loadings for a CFA testing a model of HCAHPS items and original HCAHPS factor structure .................................................................................................................. 80
Table 4.10: Generalized linear model HCAHPS item 21 .................................................. 88
Table 4.11: Generalized linear model HCAHPS item 22 .................................................. 90
Chapter I

The Research Objective

Patients’ experiences in hospitals are important indicators of quality (Epstein, Fiscella, Lesser, & Stange, 2010; Institute of Medicine, 2001). These experiences have become a national priority as healthcare providers in the United States (US) seek to achieve the triple aims of improving citizens’ experiences with care, promoting population health, and reducing health care costs (Berwick, Nolan, & Whittington, 2008). Patients’ experiences are defined as their overall perceptions of phenomena that occur during hospitalizations for which they are the best or only sources of information, e.g., personal comfort or discharge planning. Healthcare providers need to correctly assess patients’ perspectives about their experiences to ensure that efforts to achieve high levels of quality are effective (Institute of Medicine, 2001; Isaac, Zaslavsky, Cleary, & Landon, 2010).

Patients’ opinions about their experiences in hospitals are significantly associated with their opinions of those hospitals’ nursing services (Elliott, Kanouse, Edwards, & Hilborne, 2009; Jha, Orav, Zheng, & Epstein, 2008). Three recent, large, multi-hospital studies reinforced the idea that patients most strongly equated the overall quality of their care with the nursing services they received (Becker et al., 2014; Press Ganey, 2013; Wolosin, Ayala, & Fulton, 2012). Nurse researchers should, therefore, comprehensively analyze patients’ opinions about their hospital experiences in order to understand nursing’s influence on them.

Nurses in the US have traditionally focused on patients’ experiences (American Nurses Association, 1999; Burston, Chaboyer, & Gillespie, 2014). Peplau’s (1952/1991) theory of interpersonal relations is early evidence of that focus. During theory development, Peplau (1952/1991) identified the importance of patients’ experiences with care (Callaway, 2002;
Fawcett & DeSanto-Madeya, 2013; Peplau, 1952/1991). Peplau was the first theorist to declare that the work of nurses is integral to the experiences of patients. (McCaman, 2006). Peplau insisted that the focus of scientific research in nursing must always be patients, their needs, and their perceptions about the care they received from nurses (Gastmans, 1998). In the middle-range theory of interpersonal relations in nursing, Peplau (1952/1991) asserted that interpersonal relations between nurses and patients are fundamental to the delivery of high-quality health care. These interpersonal relations allow for effective communication and teaching, respectful provision of physical and emotional support, and personal growth of patients (Peplau, 1952/1991).

The Problem

Despite findings that patients’ ratings of their experiences are strongly associated with nursing care, and despite the fact that nurses in the US have traditionally focused on patients’ experiences, patient surveys devote limited space to questions that specifically ask about nursing. Only four (12%) of the 32 questions on Medicare’s Consumer Assessment of Healthcare Providers and Systems - Hospital (HCAHPS) survey (see Appendix A) are given the subheading “your care from nurses;” only three of these questions contain the word “nurse” (Centers for Medicare and Medicaid Services, 2013). In addition to the items listed under “your care from nurses,” there are other HCAHPS items that reflect the work of nurses, such as questions about how patients’ pain was managed, environmental quietness and cleanliness, staff responsiveness, medication teaching, and discharge planning. Though two other items mention “doctors, nurses, or other hospital staff,” most items refer only to “hospital staff,” even though it is likely that patients’ answers largely reflect nurses’ contributions to patients’ experiences. However, in the
HCAHPS, a nationally mandated survey of patients’ experiences, the work of nurses is formally represented by only three questions.

Other examples of the underestimation of nursing care can be found in two large, recent studies, one published in Health Affairs and the other in the American Journal of Medical Quality. The first study attributed low scores on patient experience items such as pain control, nighttime quietness, room cleanliness, and staff communication to physician inefficiency and overuse of specialists. The researchers neither considered the impact that nursing might have had on these factors nor discussed nursing as a possible variable of interest (Wennberg, Bronner, Skinner, Fisher, & Goodman, 2009). The second study demonstrated significant positive correlations between high patient experience scores and high levels of care quality (Stein, Day, Karia, Hutzler, & Bosco, 2014). Care quality was defined as low incidence of pressure ulcers, catheter-associated urinary tract infections, patient falls, venous thromboembolism, poor glycemic control, and postoperative death due to complications. All of these measures are strongly associated with nursing care (Montalvo, 2007), however the researchers did not discuss nursing care. Instead, they concluded that “most of the relationships investigated demonstrated an association between higher patient satisfaction scores and better quality of medical care” (Stein et al., 2014, p. 6).

Prior research supports the idea that good nursing care improves patients’ experiences and improves quality; evidence is needed to determine if a broader interpretation of the HCAHPS survey more accurately reflects nursing care. For the current study it was proposed that, in addition to the four items in the “your care from nurses” section, 12 HCAHPS survey items would reflect nurses’ contributions to patients’ experiences with care, as represented by Peplau’s (1952/1991) theory. It was also proposed that taken together these 16 items would
correspond to two elements of Peplau’s (1952/1991) theory of interpersonal relations in nursing: the working and the termination phases. Furthermore, it was proposed that patients’ ratings of these 16 items would significantly predict patients’ ratings of their experiences, as represented by two summative HCAHPS items, beyond predictions made by the remaining, germane HCAHPS items. Thus, this study had two goals: (a) to use patient experience data to test Peplau’s (1952/1991) middle-range theory of interpersonal relations in nursing, and (b) to research whether nursing activities, grouped according to Peplau’s (1952/1991) theory, were significantly associated with patients’ experiences in hospitals. By making these connections explicit, hospitals could improve patients’ experiences by employing key aspects of Peplau’s (1952/1991) theory as a guide for nursing practice.

Definitions

Patients’ experiences

Patients’ experiences are conceptually defined as phenomena that occur during hospitalizations for which patients are the best or only source of information, e.g., personal comfort or discharge planning (Anhang Price et al, 2014). Patients’ experiences are also defined as “their direct, personal observations of their healthcare” (Wolf, Niederhauser, Marshburn, & LaVela, 2014, p. 10). In this study, patients’ overall ratings of their experiences were operationalized by two summative rating items on the HCAHPS survey, questions 21 and 22.

Interpersonal relations in nursing

Interpersonal relations in nursing, a middle-range theory, describes nurse-patient interactions and their three-phase structure: (a) orientation, (b) working, and (c) termination. Because patients pass quickly through the orientation phase and given that this phase is not directly reflected in HCAHPS survey items, this study examined only the working and
termination phases. The working and termination phases were thought of as latent variables, which are variables that are not measured directly by designers of survey tools (Munro, 2005).

*The working phase*

The working phase is conceptually defined as patients’ identification of nurses as care-takers and resources (Peplau, 1952/1991). Theoretical components of this phase include patients’ perceptions of nurse communication, responsiveness, and management of physical environment, as well as pain control and communication about medications. In this study, the working phase was operationalized by measuring the ratings on HCAHPS items 1, 2, 3, 4, 8, 9, 11, 13, 14, 16, 17.

*The termination phase*

The termination phase is conceptually defined as discharge planning and teaching (Peplau, 1991). The theoretical component of this phase is patients’ perceptions of nurses’ provision of discharge information. In this study, the termination phase was operationalized by measuring the ratings on HCAHPS items 19, 20, 23, 24, and 25.

**Delimitations**

The study was a secondary analysis of data collected from adult patients, 18 years of age and older, who answered HCAHPS surveys about their experiences, were able to read and write in English and/or Spanish, and who were discharged within a one year period from a large, urban, academic medical center. Surveys were sent to these patients between 48 hours to six weeks of their discharges from the hospital. One year of survey data was used to encompass a consistent set of survey questions and a sufficiently large number of survey responses.
Theoretical Framework

Peplau’s (1952/1991) middle-range theory of interpersonal relations in nursing provided a theoretical framework that linked many elements of hospitalized patients’ experiences to nursing care. The relations between these elements were used to explain how hospitalized patients’ summative ratings of their experiences were influenced by their relationships with nurses. In Peplau’s (1952/1991) interpersonal relations theory, nursing is defined as an interpersonal, therapeutic process that takes place when professionals, specifically educated to be nurses, engage in therapeutic relationships with people who are in need of health services. It was proposed that nursing activities, grouped according to Peplau’s (1952/1991) theory, were significantly associated with patients’ experiences in hospitals.

While nurses are not the only health professionals concerned with people in need of health services, nurses are unique in that their major responsibilities are to provide direct care and to assist patients in integrating their hospital experiences into their lives after discharge (Peplau, 1952/1991). According to Peplau (1952/1991), nursing is a process that is “serial and goal-directed” and has “orderly steps” necessary for success (p. 5). Figure 1.1 depicts Peplau’s (1952/1991) theory, with the nurse on the left and the patient on the right. At the center is the fundamental activity of nursing, interpersonal relations with patients. In Figure 1.1 under nursing is the item labeled “A. Nursing.” This item includes the nurse-patient relationship, which Peplau (1952/1991) theorized must pass through three phases in order to be successful: (a) orientation, (b) working, and (c) termination. The three phases are correlated and ongoing, but each phase has distinct characteristics. These are described in the following paragraphs.
Orientation Phase

During the orientation phase, hospitalized patients realize that they need help and attempt to adjust to their current (and often new) experiences (Peplau, 1952/1991). Simultaneously, nurses interview patients and gain essential information about them as people with unique needs and priorities (Peplau, 1997). Nurses practice “nondirective listening” to facilitate patients’ increased awareness of their own feelings regarding their changing health (Peplau, 1952/1991). Using this therapeutic form of communication, nurses provide reflective and non-judgmental feedback to patients for the sake of helping them clarify their thoughts. Nondirective listening continues throughout the three phases of interpersonal relations.

Among the many roles that nurses assume in their interactions with patients, the first role during the orientation phase is that of “stranger.” Initially, nurses are expected to greet patients...
with the “respect and positive interest accorded a stranger” (Peplau, 1952/1991, p. 44). Patients and nurses quickly pass through this phase; however nurses must continue to display the professional courtesy and respect afforded to “strangers” throughout the three phases. Patients’ experiences during the orientation phase may have an impact on their perceptions of the other phases. Given that characteristics of the orientation phase are continued in the other two phases, the orientation phase was not hypothesized to be directly reflected in items on the HCAHPS survey.

**Working Phase**

The working phase accounts for the majority of nurses’ time with patients (Peplau, 1952/1991). In this phase, nurses make observations about patients to use during teaching and when providing physical care (Peplau, 1952/1991; 1997). Patients also assess their own situations and begin the process of recovery. Part of this process is identifying nurses as caretakers and resources. During the working phase, the roles of nurses become more familiar to patients; they are no longer perceived by patients as strangers. Patients begin to accept nurses as health educators, resource persons, counselors, and care providers. Nurses continue to practice nondirective listening and show respect and courtesy during the working phase. Before the 1990s, this phase was previously divided into “identification” and “exploitation” by Peplau; “identification” because patients “identify” the roles of nurses, and “exploitation” because patients start to use, i.e. “exploit,” the resources provided by nurses (Peplau, 1952/1991).

**Termination Phase**

The termination phase, previously known as the resolution phase, begins in the working phase with discharge planning (Peplau, 1991). The success of the termination phase is dependent on how well patients and nurses navigated the orientation and working phases
(Peplau, 1952/1991). A major part of the termination phase occurs when nurses teach patients about symptom management and recovery at home. At the end of the termination phase, patients begin to “integrate” their hospital experiences with the rest of their lives, a process that is assisted by a smooth transfer out of the hospital (Peplau, 1952/1991, p. 39). This smooth transfer is referred to by Peplau (1952/1991) as “resolution,” which occurs when the problems for which patients were hospitalized are resolved and patients are discharged.

**Integration**

Integration takes place when patients have been discharged and are attempting to incorporate their illnesses and hospital experiences into the rest of their lives (Peplau, 1952/1991). This is not a phase such as working or termination, but a state of mind. At the point of integration, “the patient feels refreshed that in his time of troubles and helplessness, aid was actually forthcoming; this is a great fear of many people – that they may at some time be helpless and others will not care” (Peplau, 1952/1991, p. 39). The state of integration occurs when all phases have been passed through. Integration has a summative characteristic; nurses support healthy integration through their skillful performances of duties during the three phases of interpersonal relationships.

**Middle-Range Theory Propositions**

Middle-range theory propositions were developed by linking the elements of hospitalized patients’ experiences with Peplau’s (1952/1991) theory, using the conceptual-theoretical-empirical (CTE) structure designed by Fawcett and DeSanto-Madeya (2013) and Gigliotti and Manister (2013) (see Figure 1.2). The CTE structure represents the theorized connections between Peplau’s (1952/1991) theory, the theoretical elements related to patients’ experiences (CMS, 2015; Goldstein et al., 2005), and the HCAHPS items that empirically tested the
theoretical elements related to patients’ experiences. The connections between aspects of nurses’ relationships with patients and patients’ global ratings of their hospital experiences are also represented in the CTE structure. In Figure 1.2, elements of Peplau’s (1952/1991) theory, at the top, provided the theoretical basis for the hypothesized relationships between different elements of patients’ experiences of care. In the middle are the theoretical elements proposed to be linked: (a) communication with nurses, (b) responsiveness of hospital staff, (c) cleanliness and noise level of the physical environment, (d) pain control, (e) communication about medicines, and (f) discharge information (CMS, 2015; Goldstein et al., 2005). At the bottom are the HCAHPS items that empirically operationalized the theoretical elements.

Another visual representation of the hypothesized relations between theoretical elements is presented in Figure 1.3, which is a path diagram in which the latent factors, Peplau’s (1952/1991) working and termination phases, are represented by circles. Lines connect the HCAHPS items that were hypothesized to represent the latent factors. Patients’ global ratings of care are represented as two boxes at the top of the diagram and were operationalized by HCAHPS questions 21 and 22. A circle at the very top of the diagram represents the latent
factor of integration. Lines connecting these two items to the latent factors depict the hypothesis that the latent factors may have a significant influence on the global ratings, which were thought to operationalize the latent variable of integration.

**Figure 1.3.** Path diagram of 15 HCAHPS items that correspond to Peplau's phases

In summary, Peplau's (1952/1991) middle-range Theory of interpersonal relations in nursing focuses on professional nurses’ therapeutic relationships with patients. Peplau (1952/1991) theorized that patient-nurse interactions followed a pattern that would be most successful when nurses were engaged as partners with patients rather than when nurses provided care for them (Peplau, 1991). Previous research supports nursing’s contribution to patients’ experiences of care (e.g., Wolosin et al., 2012). However, there are no published studies that measure how the most widely used and legally mandated patient experience survey in the US,
the HCAHPS survey, may provide a more comprehensive and theory-based picture of nursing’s contribution to patients’ experiences. Therefore, it was hypothesized that 16 items on the HCAHPS survey would correspond to two phases of Peplau’s (1952/1991) theory of interpersonal relations in nursing, and that the two global HCAHPS items would correspond with Peplau’s (1952/1991) concept of integration (see Figures 1.2 and 1.3).

**Hypotheses**

1. Peplau’s (1952/1991) middle-range theory of interpersonal relations in nursing provides a useful structure for organizing many of the domains of care that hospital patients receive from nurses, and thus can be used to create a tenable factor structure for many of the items on the HCAHPS.

   1a. A confirmatory factor analysis (CFA) of HCAHPS data will find a statistically significant fit of a Peplau-guided model in which items 1, 2, 3, 4, 8, 9, 11, 13, 14, 16, and 17 comprise a working phase latent variable and items 19, 20, 23, 24, & 25 comprise a termination phase latent variable.

   1b. A CFA of HCAHPS data will support the previous exploratory factor analyses done by CMS that found a nine-factor structure for the HCAHPS.

   1c. The fit of the Peplau-guided model will be comparable to the fit of the eight-factor model supporting the viability of the Peplau model for further study.

2. The working phase factor and the termination phase factors statistically contribute significantly to the prediction of patients’ overall experiences beyond that made by HCAHPS items unrelated to either the working or termination phases (items 5-7 and 26-32).
2a. The working and termination phase factors will contribute to the prediction of patients’ responses in which the hospital was placed on a worst-possible to best-possible hospital dimension (item 21) beyond that made by the items unrelated to either the working or termination phases.

2b. The working and termination phase factors will also make these contributions to the prediction of patients’ reported likelihood to recommend the hospital to family and friends (item 22), again beyond that made by the items unrelated to either the working or termination phases.

**Need for the Study**

This study was needed to: (a) provide further impetus for nurses in hospitals to prioritize nurse-patient interpersonal relationships as foundational to quality care, (b) better describe the relation of nursing care and patients’ experiences, (c) integrate patients as central evaluators of the quality of their care, and (d) advance nursing science by testing Peplau’s (1952/1991) middle-range theory of interpersonal relations. This study sought further impetus for nurses in hospitals to consider nurse-patient interpersonal relationships as foundational to quality care.

The social and moral imperative of nursing is to facilitate high-quality, patient-centered care (American Nurses Association, 2001; International Council of Nurses, 2010). There is recent support that the practice of relationship-based care has positive effects on patient outcomes including patients’ experiences of care as measured by HCAHPS surveys (Cropley, 2012; Wooley et al., 2012). There is also recent support for a link between more positive patient experiences with care and improved patient adherence to recommended treatment guidelines, as well as lower levels of inpatient mortality (Glickman et al., 2011; Weiss, Yakusheva, & Bobay, 2011; Srinivas, Chavin, Baliga, Srinivas, & Taber, 2014). This study proposed to investigate
important ways nurses could improve patients’ hospital care by identifying specific aspects of Peplau’s (1952/1991) theory that could guide nursing practice.

Furthermore, this study proposed to describe the relation between nursing care and patients’ experiences, and support investigations of nursing’s influence on reimbursement of hospitals. Because of the value-based purchasing clause of the recently enacted Patient Protection and Affordable Care Act (P.L. 111-148; Section 3001), the CMS have become more focused on hospitalized patients’ experiences of care. All hospitals receiving Medicare and Medicaid funding must collect data on discharged patients using the HCAHPS survey, and reimbursement is tied to global hospital HCAHPS survey scores (Lehrman & Goldstein, 2010). Patients who have had negative experiences as indicated by low scores on the HCAHPS survey represent financial losses to hospitals in the form of a 1% withholding of payments which hospitals must “earn back” on the basis of quality (CMS, 2012). This withholding will increase from 1% in 2012 to 1.25% by 2014, 1.5% by 2015, 1.75% by 2016, and 2% for fiscal year 2017 and subsequent years (CMS, 2012). Currently, global hospital ratings in the US are only in the 60th to 70th percentiles, with only 69% of patients willing to “recommend the hospital to family and friends” (CMS Hospital Compare, 2013). This indicates that hospital funding is negatively affected by undesirable experiences of patients. Another example of how undesirable experiences affect hospital funding can be found in research that describes a relation between factors that negatively influence patients’ perceptions about the quality of their care, such as unsupportive behaviors and poor communication, and the reasons that patients take legal action against nurses, physicians, and hospitals (Vincent, Young, & Phillips, 1994; Wu, Huang, Stokes, Pronovost, 2009). Nursing has the potential to influence reimbursement of hospitals because of its effect on patients’ experiences.
This study also had the potential to help integrate patients into a more central role as evaluators of their own nursing care. Aspects of the HCAHPS survey that arguably reflect nursing care provide hospitals with a valid, patient-derived critique of nursing care. This is especially important because patients’ global experience ratings show a high correlation with other aspects of quality, e.g. patient adherence to evidence-based practices or complications such as infections or decubitus ulcers (Doyle, Lennox, & Bell, 2013; Glickman et al., 2011; Isaac et al., 2010; Lehrman et al., 2010). When patients’ give good evaluations of processes of care for which they are the experts (their experiences), they are also more likely to be receiving quality care in other areas. Additionally, they are more likely to adhere to plans of care of which they are “co-producers” rather than simply recipients (Hibbard, 2003, p. I-64).

Lastly, besides financial and care-related considerations, this study had the potential to advance nursing science. The science of nursing grows through the development and empirical testing of nursing theories. This study was meant to constitute an empirical testing of Peplau’s (1952/1991) middle-range theory of interpersonal relations. Since nursing established itself as a science, the emphasis in nursing theory development has been on creating theories, with less emphasis placed on testing them (Kääriäinen et al., 2011). This study offered a test of a middle-range nursing theory. Empirical support for Peplau’s (1952/1991) theory and its relationship to patients’ experiences could also help put this theory to wider use, and contribute to the theory-based practice of nursing. This is especially important for Peplau’s (1952/1991) theory because, as Fawcett and DeSanto-Madeya (2013) point out, although the theory is still in use and relevant, few studies have been conducted to directly test its efficacy.
Chapter II

Review of the Literature

This review of the literature focuses on two hypothesized latent variables: working and termination (see Figures 1.2 and 1.3). These variables are based on two phases of Peplau’s (1952/1991) theory of interpersonal relations in nursing. In addition, research about patients’ overall experiences with hospital care is presented; this research was hypothesized to represent a third latent variable that was equivalent to Peplau’s (1952/1991) state of integration.

The working and termination phases were created from combining factors that were originally derived from the Consumer Assessment of Healthcare Providers and Systems – Hospital (HCAHPS) survey (See Appendix A). The HCAHPS, a nationally mandated questionnaire about hospitalized patients’ experiences, is administered by hospitals after discharge. Designers of the survey established that it had nine factors: (a) nurse communication, (b) physician communication, (c) responsiveness of hospital staff, (d) physical environment, (e) pain control, (f) medication communication, (g) discharge information, (h) care transition, and (i) global rating of experience. For the purposes of this study, the working phase was thought to represent items inclusive of nurse communication, responsiveness of hospital staff, physical environment, pain control, and medication communication factors. The first part of the review of the literature is based on these five factors. The termination phase was thought to represent items from the discharge information and care transition factors, and the second part of the review of the literature is based on these two factors. The state of integration experienced by patients was thought to be empirically represented by the two overall HCAHPS global ratings items: hospital rating from 0 to 10 and likelihood to recommend the hospital. The third part of the review of the literature is based on this factor.
The Working Phase of Peplau’s Theory of Interpersonal Relations

Peplau (1952/1991) theorized that the working phase of interpersonal relations between patients and nurses is of primary importance to the ways in which patients experience health care. It is well-supported that patient-nurse interactions have the most significant effect on patients’ ratings of their experiences and satisfaction with care (Johansson, Oléni, & Fridlund, 2002; Laschinger, Hall, Pedersen, & Almost, 2005; Wagner & Bear, 2008; Wolosin et al., 2012). Three qualitative and two quantitative studies that relate to nurses’ overall interpersonal work with patients are described in this portion of the review, followed by studies related to specific features of the working phase mentioned previously.

A qualitative content analysis of patients’ survey comments yielded five themes about those aspects that adult, mentally competent patients \((N = 199)\) in a southern US hospital considered to be good nursing care: (a) providing for my [patient] needs, (b) treating me pleasantly, (c) caring about me, (d) being competent, and (e) providing prompt care (Larrabee & Bolden, 2001). Using a constant comparison method, 597 significant comments were sorted. The theme of “providing for my needs” included five concepts: (a) taking care of me, (b) checking on me, (c) responding to my requests, (d) giving accurate information, and (e) providing a pleasant environment. The theme of “treating me pleasantly” included descriptors such as “pleasant,” “friendly,” “positive,” “polite,” and “not [nasty/rude/grouchy]” (Larrabee & Bolden, 2001, p. 38). “Being competent” encompassed comments such as “they know what they’re doing” and “they create confidence in me about what they’re doing” (Larrabee & Bolden, 2001, p. 38), as well as references to specific skills such as venipuncture. Patients felt that “providing prompt care” meant that nurses “get your medications and treatments on time” and
“don’t lag when the patient has pain” (Larrabee & Bolden, 2001, p. 38). The researchers noted the consistency of their themes with similar studies of patients’ perceptions about good nursing care.

A phenomenological study of mentally competent, hospitalized patients’ (N = 11) experiences of nursing care and spiritual care from nurses evoked four themes: (a) the definition of “good” and “bad” nursing care, (b) surveillance and competence, (c) spiritual care expectations, and (d) the concept of time (Davis, 2005). Participants were from the southern US, white, aged 36 to 59 years, and highly educated. They were asked: “When you were hospitalized, what did you expect from the nurse? How do you define or describe good nursing care? Do you expect spiritual care from your nurse? How do you define or describe spiritual nursing care?” (Davis, 2005, p. 128). In addition to the four themes, the notion of “presence” was a defining characteristic of good nursing care and mostly described the demeanor of the nurse: “gentle, calm, courteous, kind, attentive, comforting, sincere, available, empathetic, and reassuring” (Davis, 2005, p. 129). Participants also had expectations that nurses would be prompt, technically skilled, and medically knowledgeable. The majority of participants did not expect spiritual care from their nurses, but agreed that it would be good. Participants did describe a perception that nurses were busy, and did not have time to provide individualized care. One participant “seemed both surprised and grateful that nurses took time to establish a relationship and treat her as a ‘real person’” (Davis, 2005, p. 130). The researcher observed that what patients perceived as good nursing care affected overall satisfaction with hospitalization, and that bad nursing care tainted the entire hospital experience.

Two studies from the University of Michigan examined patients’ perceptions of missed nursing care, reports of missed nursing care on a standardized survey, and reports of adverse
events such as hospital-acquired infections or medication errors (Kalisch, McLaughlin, & Dabney, 2012; Kalisch, Xie, & Dabney, 2014). The first study used a phenomenological approach with adult, mentally competent patients (N = 38) who were asked during in-depth, structured interviews: “Do you feel that you received the care you needed? If not, what was not completed?” (Kalisch et al., 2012, p. 162). Patients’ responses were categorized by how qualified the researchers felt patients were to answer their questions; that is, how much observable behaviors by nurses the patients could reasonably account for and interpret. For example, elements of care that were considered to be “fully reportable” (Kalisch et al., 2012, p. 163) by patients were activities such as mouth care, ambulation, bathing, and treatment for pain. Partially reportable elements of care included things such as hand-washing, which nurses may have done outside patients’ rooms. Not reportable elements of care included activities such as skin assessments and intravenous site care, which patients may not have been aware were taking place. The researchers concluded that “there is a large area of care for which patients can give an account if they are cognizant of their surroundings and mentally able to do so” (Kalisch et al., 2012, p. 166). The researchers compared their data to their previous research about missing care from the point of view of nursing staff, and found similarities and differences in themes. The researchers used their findings to alter a missing care questionnaire they had previously used with nurses so that it could be used with patients (Kalisch, Tschannen, Lee & Friese, 2011).

The second study, conducted in two Midwestern hospitals, surveyed 729 patients about specific elements of nursing care they did not receive during their stay; patients who reported more overall missing care also reported more adverse events such as hospital-acquired infections or medication errors (Kalisch et al., 2014). Data were collected using the MISSCARE Survey-Patient, a valid, reliable (content validity index 0.88, Cronbach’s α coefficient .838) adaptation
of a previous instrument used to study missed nursing care from the points of view of nurses. The researchers found that higher ratings of satisfaction were negatively correlated with less missed nursing care ($r = .25, p < .001$). Patients’ reports of missed nursing care factored into three constructs: (a) basic care, (b) communication, and (c) time to response. The researchers also found that out of a potential score of 5 for most nursing care missed, patients reported more missed nursing care in the basic care factor ($2.29 \pm 1.06$) than in the communication ($1.69 \pm 0.71$) or time to respond ($1.52 \pm 0.64$) factors. Additionally, in bivariate regression analysis of demographic variables and patients’ perceptions of missed nursing care, patients with higher education levels ($\beta = .10, p = .032$), poorer perceived health statuses ($\beta = -.08, p = < .0001$), and histories of treatment for mental illnesses ($\beta = -.19, p = .002$) all reported more missed care. Patients’ reports were compared with their experiences of adverse events, and a significant ($r < .05$) correlation was established between reports of missed nursing care and experiences of adverse events. This study supports the idea that patients can evaluate their care not just from an affective standpoint, but also as recipients of specific technical care processes. In both studies, patients believed that – despite the disparate nature of the missed care processes – all of these were nursing tasks, and when they were not supplied it was because of failure by nurses.

Examples of tasks on the survey mirror items on the HCAHPS survey such as responding to call lights, listening to patients’ questions and concerns, fulfilling requests, and discharge planning.

In a quantitative, descriptive study De Vinci (2010) found that a program of sensitivity training designed to improve staff behaviors of courtesy and effective communication significantly improved patients’ ($N = 148$) overall satisfaction, $t (6) = -5.63, p < .001$, on a standardized scale used in a northeastern US hospital. The program was a commercially developed customer satisfaction intervention. The Hospital Inpatient Satisfaction Survey (HISS)
used a Likert-scale format and required fewer than 15 minutes to complete; it was given to patients on the day prior to discharge. The HISS reliably demonstrated six dimensions of patient satisfaction: (a) communication of care, (b) respect and courtesy, (c) environment of care, (d) responsiveness of staff, (e) pain management, and (f) patient education. De Vinci (2010) recommended that “modification in the environment to provide quietness, to promptly respond to patients’ call bell (including attendance to patients’ personal needs, e.g. bedpan/bathroom), courtesy and respect, patient education about medication management and cleanliness of the environment of care are important attributes in patient satisfaction that may need particular accentuation in sensitivity training of health professionals” (p. 83-84).

In summary, nurses’ overall interpersonal work with patients has been found to be highly valuable to patients. As patients and nurses progress through the working phase, patients eventually come to recognize the distinctive functions of nurses and learn how to work with them. In the next section, studies that specifically included data about aspects of nurse-patient communication are examined.

**Nurse-patient communication.** Nurse communication is one of the most important aspects of nurses’ work with patients (Peplau, 1952/1991), and has a strong influence on patients’ perceptions about their hospital experiences (Press Ganey, 2013; Wolosin et al., 2012). Three quantitative studies that specifically relate to nurse communication are included in this section of the review.

In a descriptive study that used Peplau’s (1952/1991) theory of interpersonal relations in nursing as its theoretical framework, the HCAHPS nurse communication scores on a single medical-surgical unit were monitored for a period of three months, during which time a program of “bedside” shift reports was initiated (Radtke, 2013). The process for completing these shift
reports, previously given in private between two nurses, was changed; in the study they were to be completed at the bedside and to have included patients and their family members. In addition to monitoring HCAHPS scores, qualitative interviews with 44 patients were also done during the three-month intervention period by a staff member from the quality improvement department of the study hospital who was not associated with the unit. Scores in the HCAHPS domain of nurse communication rose from an average of 75% for the six months prior to the study to an average of 87.6% at the end of the three-month period (statistical significance was not reported). The number of surveys reviewed during this period was not reported, although researchers noted that the hospital collected more than 1100 surveys per year. Patient comments compiled by the quality improvement staff member were positive and supported that communication with nurses had been enhanced. This study supported the premise that if hospitals based nursing care delivery models on Peplau’s (1952/1991) theory they could significantly improve HCAHPS survey scores, although this assumption requires further validation.

In a similar study, researchers placed and facilitated appropriate use of dry-erase patient communication boards in medical patients’ rooms in a Milwaukee, Wisconsin hospital (Singh et al., 2011). Scores from the sections on standardized patient satisfaction surveys titled “nurses kept you informed,” “physicians kept you informed,” and “staff included me in decisions” were tracked for three six-month periods before the intervention and two six-month periods after. Scores for food quality and room temperature served as controls and were also tracked for these units. After the intervention, out of a possible 100 points, the mean patient satisfaction scores for nurse communication increased by 6.4 points (from $M = 82.2$, $SD = 23.2$ to $M = 88.6$, $SD = 17.2$, $p < .001$), for physician communication scores by 4.0 points (from $M = 81.0$, $SD = 24.4$ to $M = 85.0$, $SD = 21.6$, $p < .05$), and for decision making scores by 6.3 points (from $M = 78.8$, $SD =$
24.3 to $M = 85.1$, $SD = 20.7$, $p < .01$). The values of t for t-test analyses were not reported. There were no significant changes in these scores on surveys from surgical patients, in whose rooms dry-erase boards had not been installed, nor were there any significant changes in the intervention patients’ scores for satisfaction with food quality and room temperatures. The researchers suggested that dry-erase boards were a simple tool that supported increased patient engagement and helped facilitate provider-patient communication.

In a large study of HCAHPS data, Elliott et al. (2012) identified that among study participants, women reported generally less positive experiences than men, and communication with nurses was the most important measure in predicting ratings scores given by women. These finding were from a study of 2007-2008 HCAHPS survey data from 1,971,632 surveys collected from 3,830 hospitals, in which female respondents comprised 58% of the sample ($N = 1,147,918$). Results of bivariate analysis revealed that men evidenced significantly higher mean scores relative to women on nine of ten measures, including (respectively) overall rating ($M = 86.2$ vs. $M = 85.6$), recommendation ($M = 86.6$ vs. $M = 85.6$), nurse communication ($M = 89.0$ vs $M = 88.3$), doctor communication ($M = 90.5$ vs. $M = 91.1$), staff responsiveness ($M = 82.8$ vs. $M = 81.4$), pain management ($M = 86.3$ vs. $M = 86.0$), communication about medicines ($M = 75.4$ vs. $M = 71.8$), discharge information ($M = 81.1$ vs. $M = 78.1$), cleanliness ($M = 87.8$ vs. $M = 84.1$) and quietness ($M = 79.0$ vs. $M = 78.6$). The values of t and SD were not provided for these t-tests analyses. A multiple linear regression model indicated that the nurse communication domain was the most important measure in predicting rating scores given by women.

In the previous section, studies were examined that specifically included data about aspects of nurse communication in the working phase. Nurse communication is related to nurse responsiveness, which is defined as occurring when patients receive physical assistance in a
fashion they perceive as timely. The next section examines studies related to nurse responsiveness.

**Responsiveness.** Responsiveness, defined as occurring when patients received physical assistance in a fashion they perceived as timely, is dependent on adequate nurse staffing levels. A variety of studies have linked overall nurse staffing levels to hospitalized patients’ ratings of their experiences and satisfaction with care (Aiken et al., 2012; Jha et al., 2008; Larrabee et al., 2004). These studies showed a positive relation between higher numbers of nurses per patients and better patient experiences. Additionally, in hospitals with higher numbers of nurses who are “burned out” and at risk for being less responsive to patients’ needs, there are lower levels of patient satisfaction (Stimpfel, Sloane, & Aiken, 2012; Vahey, Aiken, Sloane, Clarke, & Vargas, 2004). Four quantitative studies that specifically related to nurse responsiveness are included in this section of the review.

In a study of 21,000 patients discharged from 40 California hospitals, a series of bivariate regression models (treating hospital size as a covariate) evidenced a statistically significant positive relation between nursing hours per patient day and the dimension reflecting patient-perceived respect from nurses for patients’ values, preferences, and expressed needs ($F = 4.75, p = .04$)(Bolton et al., 2003). The researchers described the relation between staffing and outcome variables but failed to report the value of $R^2$ for the regression model. Hospitals represented a robust cross-section of urban, rural, community, academic, large, and small facilities. In the study, nurse staffing variables were collected from the California Nurses Outcomes Coalition (CalNOC), and CalNOC data were compared with patients’ responses on a satisfaction survey from hospitals participating in the Patients’ Evaluation of Performance in California (PEP-C) project. Specifically, in addition to perceiving a lack of respect from nurses for values,
preferences, and needs, patients who received a lower number of nursing hours per patient day also reported more incidents of nurses talking in front of them as if they weren’t there, which was a question on the survey used in the PEP-C. The researchers noted the importance of nurse responsiveness, and observed that when hospitals attempted to increase their patient satisfaction ratings they succeeded by increasing the number of nursing staff.

Another large study of patients’ satisfaction and nurse staffing levels that was completed with responses from 827,430 patients from 733 hospitals in 25 states, found a weak correlation between nurse staffing and patients’ satisfaction with nursing care \((r_{[827,428]} = 0.054, p < .001)\) (Clark et al., 2007). In this study, statewide registered nurse (RN) employment data were collected from the US Department of Health and Human Services. The ratio of working RNs per state population was compared with the answers to six questions in the satisfaction with nursing sections of standardized satisfaction surveys. These surveys were from hospitals whose locations corresponded to the locations and time frames of the RN employment data. The six questions measured the following: (a) friendliness/courtesy of the nurses, (b) promptness in responding to the call button, (c) nurses’ attitude toward requests, (d) amount of attention paid to special or personal requests, (e) how well the nurses kept [patients] informed, and (f) skill of the nurses. Composite scores for this section were also used in the study to determine global ratings of satisfaction with nursing care. Analysis of overall surveys found the most significant correlation between state RN supply and patient satisfaction (Pearson \(r = 0.54; p < .001\), when compared with the ways that other survey domains, such as physician, environment, or meals, related to patient satisfaction. The researchers also reported that states’ supplies of working RNs per patient were significantly and positively associated with patients’ overall satisfaction with care as measured by the satisfaction survey (Pearson \(r = 0.44; p < .05\))” (Clark et al., 2007).
There were other items that also showed a significant, positive correlation with levels of RN staffing, some of which are not typically thought of or measured as nursing functions. Examples of these items given by Clark et al. (2007) included: “personal issues (e.g., emotional/spiritual needs, pain, and involvement in decision making) (Pearson r = 0.42; p < .05); discharge processes (Pearson r = 0.42; p < .05); and explanation of tests and treatment (Pearson r = 0.48; p < .05)” (p. 122). This finding is supportive of the premise of the current study: that nurses contributions to patients’ experiences are not currently being adequately measured.

In a cross-sectional, secondary data analysis by Kutney-Lee et al. (2009) HCAHPS data were analyzed using a series of bivariate ordinary least squares regression models that were performed to assess the relations between nurses’ work environments and patient satisfaction in 430 hospitals in California, Pennsylvania, New Jersey, and Florida. Significant positive correlations with patients’ experiences were found for nine out of ten nurse-reported aspects of work environments. Data about hospital size, teaching status, ownership, and population served were obtained from the American Hospital Association. Data about nurses’ work environments were obtained from the University of Pennsylvania’s multi-state nursing outcomes study to assess the relations between nurses’ work environments and patient satisfaction. Favorable nurse ratings of their work environment were significantly associated with patients’ high HCAHPS overall ratings and likelihood to recommend the hospital to family and friends, in the context of the ordinary least squares regression model. The researchers did not report the value of $r^2$ for the regression models, as well as the value of beta. Importantly, the researchers noted that “the effect of nurse staffing above and beyond the effect of the overall nurse work environment demonstrated that for each additional patient per nurse, the percentage of patients who would definitely recommend the hospital decreased by 1.44 percent” (Kutney-Lee et al., 2009, p.
High-quality nurse work environments and sufficient staffing enabled nurses to be responsive to patients and led to better patient experiences.

Patients who were isolated because of antibiotic-resistant organisms or infection prevention measures found all hospital staff, including nurses, to be less responsive and these patients reported worse experiences of care than non-isolated patients (Vinski et al., 2013). In a study at a 1,200 bed hospital in Ohio, nine months’ worth of HCAHPS surveys from 8,436 patients were reviewed. Of these patients, 203 were isolated due to infection with multi-drug resistant or airborne organisms or with the bacteria *C. difficile*. Comparisons of these patients’ demographic variables and HCAHPS scores were made using $\chi^2$ tests for categorical variables and Kruskal-Wallis tests for ordinary or continuous scores between groups. Patients in isolation reported significantly lower scores for staff responsiveness to help with bathroom visits or bedpans relative to patients who were not in isolation ($M = 48, SD = 48, p < .001$). Patients in isolation also reported significantly lower scores for physician communication relative to patients who were not in isolation ($M = 58, SD = 46, p < .001$). Test statistics for Wilcox rank sum test or Kruskal-Wallis tests were not reported. Patients also showed a trend toward lower responses regarding nurse communication, cleanliness, and recommending the hospital to family and friends; however, this trend did not achieve significance at the 0.05 level. This study examined responsiveness differently from studies that examined nurse staffing data. The researchers did not speculate as to the reasons why staff were less responsive to isolated patients.

A risk exists that patients in isolation will perceive worse experiences of care with regard to their physical environment. The next section of this review examines two other aspects of the physical environment, cleanliness and noise.
Physical environment. The work of nurses has traditionally been associated with cleanliness of the physical environment (e.g. Nightingale, 1860; Castledine, 2000). A qualitative sociological study using the framework of French sociologist Bourdieu’s theories of “habitus, field, and capital” identified that hospital and operating room nurses feel responsible for hygiene and cleanliness (Brown, Crawford, Nerlich, & Koteyko, 2008). Three themes were described: (a) “securitization,” which addressed the roles of auditor and surveyor that nurses in the study assumed with regard to cleanliness; (b) “struggling against delinquent doctors,” wherein nurses in the study reported on having to remind physicians about cleanliness and hygiene; and “back to basics,” in which nurses related the impression that the cleanliness of the hospital environment was a fundamental responsibility of nurses (Brown, Crawford, Nerlich, & Koteyko, 2008). Nurses also were described as acquiring authority - “a hygiene capital,” (Brown, Crawford, Nerlich, & Koteyko, 2008, p. 1053) - through their enforcement of standards of hospital cleanliness.

The role of nurses as auditors and reminders was put into direct practice in the work of Berenholtz et al. (2004) and Pronovost et al. (2006), who introduced the use of central line insertion checklists to reduce central line infections. Nurses used checklists to monitor central line insertion by physicians, physician assistants, or nurse practitioners, and were empowered to stop procedures if practitioners failed to meet elements of a sterilization and safety checklist (Berenholtz et al., 2004). The use of these nurse-administered checklists significantly reduced the incidence of central line infections and has been put into place in hospitals across the country (Pronovost et al., 2006).

However, when nurse staffing is inadequate, health-care associated infections significantly increase (Hugonnet, Chevrolet, & Pittet, 2007). Researchers studied infection rates
in 1,883 patients who had a median length-of-stay of five days in an 18-bed critical care unit in Geneva, Switzerland. After controlling for patient variables such as demographic characteristics and illness severity, researchers found a significant positive correlation \((p < .05)\) between worse nurse staffing and increased rates of infection. The researchers stated that: “If nurse-to-patient ratio was maintained >2.2 and assuming causality, 121 infections would have been prevented, yielding a population attributable fraction of 29.1\% (95\% CI, 12.6-2.4)” (Hugonnet, Chevrolet, & Pittet, 2007, p. 79).

Hospital cleanliness and infection transmission is associated with nursing practice, as are noise levels. In response to low HCAHPS scores at a 649 bed medical center, where only 43\% to 50\% of patients surveyed stated the area around their rooms was “always” quiet at night, researchers measured noise levels with handheld dosimeters in order to collect pre-intervention data; they found that nightly noise levels at the nurses’ stations were equivalent to the noise levels of heavy traffic (Murphy, Bernardo, & Dalton, 2013). The researchers used Nightingale’s *Notes on Nursing* as their theoretical rationale. After piloting a bundle of noise reduction strategies on a single unit, the researchers undertook a hospital-wide intervention that increased HCAHPS scores to 60\%. The researchers observed that the “most important lesson [they learned] is the critical role of nurses in ensuring that units remain quiet at night” (Murphy, Bernardo, & Dalton, 2013, p. 51).

Noise levels in hospitals were higher than the World Health Organizations’ guidelines for community noise, and were associated with significant sleep loss for patients (Yoder, Staisiunas, Meltzer, Knutson, & Arora, 2012). In a study conducted at a Chicago hospital, 106 patients agreed to participate in a survey about their sleep quality and rate disruptions to their sleep during their hospitalizations. Noises were recorded and noise levels were monitored and
analyzed by researchers using electronic monitoring devices. Patients exposed to the loudest nighttime noise levels slept significantly less in the hospital than their self-reported baseline (314 minutes versus 382 minutes, \( p = .002 \)). Furthermore, in a multivariate analysis (controlling for study day, race, age, sex, and Pittsburgh Sleep Quality Index (PQSI) scores, and clustered by subject), the researchers found that patients exposed to the loudest average nighttime noise levels slept 76 minutes less than patients exposed to the quietest nighttime noise levels (\( m = -76, 95\% \) CI, -134 to -18 minutes; \( p = .01 \)). The \( t \)-statistic was not reported for this finding. The most common sources of noise reported by patients were (a) staff conversations, (b) roommates, (c) alarms, (d) intercoms, and (e) pagers. Staff conversations have been reported in another study as disruptive (Davis, 2005), and represent a factor over which nurses have control (Larrabee & Bolden, 2001).

During the development of a survey tool to measure patients’ assessment of the quality of nursing care, 24 patients hospitalized in North Carolina were interviewed, and themes from the interviews were converted into a questionnaire on which patients identified environmental quietness as an important aspect of care (Lynn, McMillen, & Sidani, 2007). Using a grounded theory approach, patients were asked: “How would you describe or define quality nursing care?” (Lynn et al., 2007, p. 161). A tool was developed using themes from the interviews and tested on 1,470 patients from 43 medical-surgical units in seven hospitals. An exploratory factor analysis of the tool resulted in five factors. Four of these factors had to do with the interpersonal qualities of nurses: (a) individualization, (b) nurse characteristics, (c) caring, and (d) responsiveness. The fifth, however, identified nurses’ control over environmental noise as central to the concept of quality nursing care. Patients’ comments that were used for the “environmental noise” questions were: “the hall was noisy” and “it was noisy in my room”
Patients clearly perceived this aspect of the hospital environment to be under the control of nurses, and were less satisfied when noise levels were high.

In addition to noise, pain is another noxious stimulus that negatively affects patients’ hospital experiences. The following section examines studies that specifically included data about pain control by nurses.

**Pain control.** In two national studies of HCAHPS data from 2,429 and then 2,517 hospitals (respectively), higher global satisfaction ratings were positively correlated with patients who reported higher levels of pain control (Gupta, Daigle, Mojica, & Hurley, 2009; Gupta, Lee, Mojica, Nairizi, & George, 2014). In another similar study, regression analysis from survey results from 2,720 patients on 278 units in 146 different US hospitals indicated that increased satisfaction was correlated with a few variables, including “symptom management” by nurses ($\beta = .267$, $SE = .078$, $p < .001$). The entire model explained about 31% of variance in the dependent variable ($r^2$ for the entire model = .313) (Bacon & Mark, 2009). Pain management is “an essential responsibility for nurses” (Institute of Medicine, 2011a, p. 203), and optimal nursing care includes the timely use of evidence-based practices with regard to the relief of pain (American Society for Pain Management Nursing, 2013).

A descriptive study conducted in an urban hospital in Texas measured patients’ satisfaction with care and with nurses’ postoperative pain management in an ambulatory surgery setting (Yellen, 2003). The goal of the study, which used Spearman’s rank-order correlation coefficient test, was to explore the influence of selected variables such as age, gender, and culture. Some expected relations were supported by the research, such as a relation between subjects’ ages and numbers of hospitalizations. The researcher also noted significant relations between satisfaction with pain management and variables such as gender and ethnicity. A
significant inverse association was found between pain and satisfaction with pain management ($r_s = -0.36, p < .01$). Overall patient satisfaction was also measured, and it was found to be most highly correlated with communication with nurses (statistics not reported). In the conclusion of the study, Yellen (2003) made this pertinent observation:

> Present methods of collecting patient satisfaction data focus on services and settings, relegating nursing to a minor part of the health care experience. Nurses need to participate in defining patient satisfaction and quality of care so that their contributions will be measured in promoting improvements in patient care (p. 792).

An intervention to increase the effectiveness of nurses’ pain management was successful in raising the HCAHPS scores related to pain management (Jarrett, Church, Fancher-Gonzalez, Shackelford, & Lofton, 2013). Subjects of this study were 286 nurses working in an acute care hospital in Arkansas. Nurses were primarily female, and their ages ranged from 21 to 69 years. A repeated measures model was used to measure changes in learning and attitude about pain before, immediately after, and six months after a 60 minute didactic learning experience. Repeated measure ANOVA ($F[1.725, 281.174] = 373.96, p < .0001$) found significantly better scores between the first test and the second, as well as between the second test and the third six months later ($p < .017$). Additionally, HCAHPS scores in the domain of positive experience with pain management increased from 66% pretest to 74% at six months, representing an improvement that moved the hospital’s ranking in this domain from the 54th to the 79th percentile. Nurses anecdotally reported to the researchers that after the intervention they were more likely to give pain medications on a schedule as opposed to “as needed,” and that they were more empathetic to patients and more vigilant about performing frequent pain assessments and
reassessment. In a recent study, researchers Craig, Otani, and Herrmann (2015) supported the link between satisfaction with nursing and satisfaction with pain control, stating: “No matter the level of pain control, nursing was always the most influential attribute in patient satisfaction” (p. 1).

In the previous section, studies that specifically included data about nursing pain management during the working phase were examined. The next section examines one recent study related to nurses’ communication about medications, for pain and other problems.

**Medication communication.** In an effort to improve patient experiences with medication communication, nurses at a hospital in Maine designed a medication binder to be left in patients’ rooms and used as part of nurse teaching about medications (Grant, 2012). The binders included information printed in large type face, written at a 6th grade level, with pictures of medications, and kept in dedicated baskets in patients’ rooms. The pages of the binders were sleeved in plastic so they could be washed between patients. Prior to this intervention, scores on the HCAHPS question 17 were between 20% and 30%. This question asks: “Before giving you any new medications, how often did the hospital staff describe possible side effects in a way you could understand?” (Grant, 2012, p. 14). After the intervention, scores for this question rose to between 40 and 50% (chi-square analysis was not presented within this article).

Patients may receive medication instructions during the working phases of their interpersonal relationships with nurses, or during the termination phases, when teaching and assistance with planning to be discharged takes place. The next section focuses on hospital discharges and their effect on patients’ experiences.
The Termination Phase of Peplau’s theory of Interpersonal Relations

The termination phase begins in the working phase with discharge planning (Peplau, 1952/1991). During the termination phase, patients must begin to integrate their illness experiences with the rest of their lives and leave the hospital (Peplau, 1952/1991). The success of the termination phase is dependent on how well patients and nurses navigate the orientation and working phases (Peplau, 1952/1991). A major part of the termination phase includes teaching from nurses about needs related to symptom management and recovery at home. In the following section, theories and research that relate to patients’ experiences with discharge from hospitals will be examined.

In a study of HCAHPS responses from 430,982 patients in 2,562 different hospitals, higher overall ratings of experiences and higher ratings of experiences with the discharge information domain were associated with lower 30-day hospital readmission rates (Boulding, Glickman, Manary, Schulman, & Staelin, 2011). The American Hospital Association (AHA) database provided hospital structural characteristics, and clinical process measures were obtained from CMS with regard to three illnesses: (a) acute myocardial infarction, (b) pneumonia, and (c) heart failure, as well as 30-day hospital readmission rates. Correlation analysis supported that higher overall ratings of experiences were associated with lower 30-day risk-standardized readmission rates for all three clinical conditions (myocardial infarction \( r = -0.199 \), heart failure \( r = -0.203 \), & pneumonia \( r = -0.159 \)). Additionally, correlation analysis showed that higher ratings of experiences with regard to the discharge information domain were also associated with lower risk-standardized readmission rates for all three clinical conditions (myocardial infarction \( r = -0.167, p < .001 \), heart failure \( r = -0.188, p < .001 \), and pneumonia \( r = -0.129, p < .001 \)). The researchers also found that the nurse communication HCAHPS domain had the strongest
correlation with higher overall patient ratings of experience \((r = 0.845, p < .001)\) for their sample, as it has been found to have in other studies (e.g., Press Ganey, 2013; Wolosin et al., 2012). This finding is supportive of another large study, which demonstrated that without sufficient nursing staff to adequately care for and discharge patients, readmission rates were elevated (McHugh, Berez, & Small, 2013).

McHugh, Berez, and Small (2013) linked higher nurse staffing levels with 25\% lower odds of being penalized by the CMS for excessive thirty-day readmissions. The researchers used publically available readmission penalty data for the period of July 1, 2008 to June 30, 2011 and compared these data to AHA survey data about nurse hours per adjusted patient day. Hospitals with higher nurse staffing had 25\% (OR: 0.75; 95\% CI: 0.64-0.89) lower odds of being penalized than lower-staffed hospitals, even after the researchers controlled for residual covariate imbalance. Logistic regression models of the same data supported that: “each additional nurse hour per adjusted patient day was associated with 10\% lower odds (OR: 0.90, 95\% CI: 0.86-0.93) of being penalized” (McHugh et al., 2013, p. 1743). The researchers observed that the value of adequate levels of nurse staffing is well-supported, and that it may be advisable to mandate adequate staffing levels by law if hospitals wish to improve problems such as high readmission rates.

The findings of the studies by Boulding et al. (2011) and McHugh, Berez, and Small (2013) resonated in another study by Brooks-Carthon, Kutney-Lee, Sloane, Cimiotti, and Aiken (2011), which showed that nurses who worked in hospitals with higher concentrations of Black patients reported poorer confidence in patients’ readiness for discharge than nurses who did not work in hospitals with higher concentrations of Black patients (with hospitals having 11\% Blacks as the reference category, hospitals having >23\% Black patients = fully adjusted
parameter estimate = 7.78, p<.001). Additionally, patients treated in these hospitals reported worse experiences, as measured by scores on four HCAHPS items that the researchers felt were closely related to nursing care: (a) communication with nurses (with hospitals having 11% Black patients as the reference category, hospitals having 11%-23% = unadjusted parameter estimate = -2.75, p < .01), (b) responsiveness of staff (with hospitals having 11% Black patients as the reference category, hospitals having 11%-23% = unadjusted parameter estimate = -3.24, p < .001, hospitals having >23% Black patients = unadjusted parameter estimate = -2.95, p < .05), (c) adequacy of discharge information (with hospitals having 11% Black patients as the reference category, hospitals having 11%-23% = unadjusted parameter estimate = -1.72, p < .01), and (d) global measure of patients’ willingness to recommend the hospital to friends and family (with hospitals having 11% Black patients as the reference category, hospitals having 11%-23% = unadjusted parameter estimate = -2.74, p < .05, hospitals having >23% Black patients = unadjusted parameter estimate = -3.46, p < .05). Using ordinary least squares regression models, the researchers also measured nurse-reported workloads, and found that as nurses’ average workloads increased by one additional patient per nurse, the proportion of patients who were willing to recommend the hospital decreased by 1.5%.

**Discharge information.** In a descriptive study researchers found that a steady improvement in patients’ experiences over the course of one year was achieved by three interventions: (a) enhancement of nurses’ skills in teaching patients to care for themselves at home, (b) post-discharge phone calls made by nurses, and (c) daily patient rounds done by nurse managers (Kennedy, Craig, Wetsel, Reimels, & Wright, 2013). Kennedy et al. (2013) tracked HCAHPS scores from a 28-bed vascular surgery unit in a South Carolina hospital after putting three nursing practices in place that demonstrated sufficient effectiveness to improve patients’
experiences, especially with regard to discharges. A total of 165 surveys were reviewed, and overall ratings of patients’ experiences increased from 66% to 76% to an end point of 83 to 93%. Researchers also provided weekly reports of patients’ experience scores to nursing staff; these were believed to have motivated nurses to follow procedures to the fullest. In their conclusion, Kennedy et al. (2013) commented on the success of all three evidence-based practices, especially discharge calls and their positive effects not just on patients’ experiences but also on patients’ safety and avoidance of complications and readmissions.

In a descriptive study, discharge phone calls and a pre-admission website dramatically improved patients’ experiences of care and increased HCAHPS scores at an Ohio hospital system (Natale & Gross, 2013). Over a 19-month period, data from 425 completed HCAHPS surveys were analyzed. When compared with patients who had not visited the website, patients who had viewed the pre-admission website had a 36% increase in overall hospital ratings, a 57% increase in perceptions of communication with nurses, a 57% increase in pain management, a 47% increase in ratings of staff responsiveness, and a 57% increase in perceptions of communication with physicians. Discharge phone calls were made from a centralized location and data gathered from these calls was analyzed. Answers to frequently asked questions were incorporated into the pre-admission website in a continuous cycle of improvement. When compared with patients who had not received discharge phone calls, those patients who received discharge phone calls had a 9% increase in hospital ratings, a 5.5% increase in the likelihood they would recommend the hospital, a 4.3% increase in perceptions of communication with nurses, and a 6.8% increase in ratings of staff responsiveness. The researchers posited that the calls had helped foster “patient engagement” (Natale & Gross, 2013, p. 91), a central concept that, they theorized, helped improve the quality of patients’ experiences. The value of discharge
calls was supported as well in a case study report by Eggenberger, Garrison, Hilton, & Giovengo (2013) that credited increased HCAHPS scores with discharge calls made by a clinical nurse specialist.

In a descriptive study by Ciaramella, Longworth, Larraz, & Murphy (2014), the implementation of a discharge nurse role was credited with increases in HCAHPS scores on a mother-baby unit (MBU) that discharged approximately 1,800 mother-baby pairs a year. After the staff discharge nurse was employed, the unit’s score in the HCAHPS domain rose from the 22nd percentile in 2011 to the 76th percentile in 2012 and to the 95th percentile in 2013. In addition to a personal patient visit and a group class, the discharge instructions were also recorded live by the discharge nurse and emailed as an audio file or sent to the mother’s cell phone for repeated listening.

Patients who reported experiencing higher levels of “patient-empowering nurse behaviors” had greater levels of “post-discharge activation,” which was significantly associated with post-discharge “mental functional health status” (Jerofke, Weiss, & Yakusheva, 2014, p. 1311). In a Milwaukee hospital, 113 postsurgical oncology and cardiology patients were enrolled in a non-experimental, prospective, correlational study that measured their perceptions of patient-empowering nurse behaviors. These behaviors were similar to features that Peplau (1952/1991) described in the theory of interpersonal relations in nursing, and included: “(a) helping patients to realize they can participate in their care and treatment planning; (b) providing patients with access to information, support, resources, and opportunities to learn and grow; (c) helping to facilitate collaboration with providers, family, and friends; and (d) allowing [sic] patients autonomy in decision-making” (Jerofke et al., 2014, p. 1311). The researchers used a simultaneous equation estimation model to examine the data. Results indicated that patient
empowering nurse behaviors were significantly associated with post discharge patient activation levels. Regarding the overall model, the researchers noted that some of the coefficients in this study were small. For example, regarding patient length of stay in the hospital, in equations 1, 2, 3, and 4, the coefficients were .08, -.24, .03, and .54, respectively. However, the researchers concluded that “although the coefficient was small, we believe that these findings provide support for the contribution of patient-empowering nurse behaviors to patient participation in self-management behaviors” (Jerofke et al., 2014, p. 1319).

**Patients’ Overall Perceptions about Their Hospital Care**

Previous research demonstrated varied approaches to the study of patients’ experiences with hospital care. Some researchers assessed what was “important” to patients (Cleary et al., 1991), what patients perceived was “good” and “not so good” about their care (Attree, 2001), or how patients generally evaluated their experiences (Coulter & Cleary, 2001; Entwistle, Firnigl, Ryan, Francis, & Kinghorn, 2012; Pettersen, Veenstra, Guldvog, & Kolstad, 2004). Additionally, many researchers have studied satisfaction with care (Gill & White, 2009). This portion of the literature review will focus on four large studies conducted in the United States (US) that measured patient ratings of their experiences with hospital care. Studies of patients’ satisfaction with care will also be reviewed.

In the first published, nation-wide evaluation of HCAHPS survey results, cumulative data from a period of one year (July 2006 through June 2007) collected in 2,429 hospitals indicated that patients in the category reflecting the most positive overall experiences were significantly more likely to be in the group with the higher numbers of nurses per patient days ($p < .001$) (Jha et al., 2008). More than 75% of hospitals in the study had 300 or more patients who responded to the HCAHPS survey, and only 3% had fewer than 100 patients respond; this represented a
robust sample of surveys. Response rates for surveys from hospitals averaged 36%. Hospital characteristics and HCAHPS ratings were examined using multivariate regression models that adjusted for potential confounding variables such as numbers of beds in hospitals or percentages of patients receiving Medicaid health benefits. A higher number of patients being cared for by individual nurses, calculated using staffing information from the AHA annual survey, was found to be predictive of lower average HCAHPS ratings. Specifically, among the lowest quartile reflecting the lowest ratio of nurses to patients, 60.5% of patients were in the high global rating category. However, among the highest quartile reflecting the highest ratio of nurses to patients, 66.7% were in the high global rating category ($p < .001$; the value of $\chi^2$ is not reported for this chi-square test). The researchers also observed that many hospitals had low scores related to discharge instructions and medication teaching, and that scores differed by regions. Hospitals in the Northeast and Western parts of the US had the lowest scores in these domains.

Next, in a multinomial logistic regression study, hospitals that provided excellent clinical care, excellent patient experiences, or both, were identified and described (Lehrman et al., 2010). Clinical process measures were obtained from the Centers for Medicare and Medicaid (CMS) Hospital Compare website for a 22-Hospital Quality Alliance. These included measures such as adherence to treatment guidelines and prevention of surgical site infections. Top performing hospitals on both quality measures tended to be small $< 100$ beds (log odds = -1.44), large $> 200$ beds rural (log odds = 1.34; reference group = $< 200$ beds urban), located in the New England (log odds = 2.23) or West North Central (log odds = 2.09) Census divisions (reference group = Pacific), and non-profit (log odds = 1.36; reference group = Private). For the same study, statistics about patients’ ($N = 1,172,822$) experiences were obtained from the HCAHPS data set for October 2006 to June 2007 for 2,583 hospitals that collected surveys. The response rates to
the HCAHPS surveys were not reported. Results were geographically representative of all US hospitals, and researchers found that while 41.8% of hospitals provided excellent clinical care, excellent patient experiences, or both, 58.2% provided neither. The researchers observed that there was no “trade-off” (Lehrman et al., 2010, p. 50); hospitals did not seem to have sacrificed performance in one area for the sake of performance in the other. This study was a precursor to other research that supported patients’ abilities to evaluate not just their own experiences with care, but also, by extension, the clinical quality of the care they received while in the hospital.

In a study using linear models and paired tests of HCAHPS results from the first and second year that they were publically reported, average scores of hospitals (N = 2774) were found to have significantly (p < .001) increased in all patient experience domains except communication with physicians (Elliott et al., 2010). The largest increases were in the areas of staff responsiveness and discharge information. Comparable national data from March of 2008 and March of 2009 were examined using paired tests to assess within-hospital changes. These data included the responses of more than two million patients; response rates averaged 34% for both months. Of note, the researchers found similar results for a subset of hospitals in which the response rates were greater than 60%. The researchers observed differences in newly reporting hospitals, i.e., ones that had not participated in HCAHPS data collection in 2008 but reported data for 2009. Overall, these hospitals, both large and small, performed better than hospitals that reported in both years. The researchers observed that hospitals’ quality improvement initiatives appeared to be working, and that “although this could be construed as ‘teaching to the test,’ real improvement has occurred in domains of interest to patients” (Elliott et al., 2010, p. 2067).

In a binary logistic regression (N = 136,546), researchers investigated how much effect the different HCAHPS domains had on overall scores and found that higher nurse
communication domain scores were significantly related to achieving the highest possible HCAHPS scores (OR = 1.05, 95% CI was not provided, $p < .001$) (Wolosin, Ayala, & Fulton, 2012). This 2008 study, which controlled for such demographic data as age, gender, race, education, preferred language, and self-reported health status of randomly-sampled subjects, had an overall average response rate of 34%. Researchers determined that a change in the domain of nurse communication increased the probability that patients would give hospitals the highest possible scores. In their discussion section, the researchers made important recommendations: “These findings show that hospitals focusing on HCAHPS overall satisfaction and thus their value-based purchasing score and Medicare reimbursement would likely see the greatest impact by engaging in improvements to nursing care. We [the researchers] suggest that nurse workload should be managed so as to afford nurses the time required to provide personalized patient care” (Wolosin et al., 2012, p. 324). The researchers also recommended that when hiring nurses, hospitals choose candidates “who have good interpersonal skills” (Wolosin et al., 2012, p. 325), which supports the hypothesis of the current study with regard to the importance of nursing practice that is based on Peplau’s (1952/1991) interpersonal theory of nursing.

In the preceding studies, some of hospitalized patients’ ratings of their experiences seem to have been related to features that hospitals cannot control, e.g., size, location, ownership, and teaching status. However, in two of the studies, the number of nursing staff available to provide care and patients’ perceptions about nurse communication had significant effects on ratings of care. This trend can also be observed in studies that evaluate hospitalized patients’ satisfaction with care which is discussed in the following paragraphs.

**Hospitalized patients’ satisfaction with care.** Although conceptually underdeveloped and flawed (Gill & White, 2009; Sitzia & Wood, 1997), the idea of patient satisfaction with care
has nonetheless been measured for more than 50 years (Castle, Brown, Hepner, & Hays, 2005; Sitzia & Wood, 1997) and is considered to be an important indicator of quality (Donabedian, 1992). It is frequently confused with or used interchangeably with patients’ experiences, which are evaluated by the HCAHPS survey. However, the HCAHPS survey was not designed to assess satisfaction (Lehrman, 2013). Critics of satisfaction surveys argue that currently used satisfaction measures are unreliable, because up to 25% of US citizens are illiterate (Williams & Swanson, 2001); others emphasize that many determinants of satisfaction may not be affected by health care providers (Aharony & Strasser, 1993).

Determinants of satisfaction with care over which practitioners have little or no control include patient age, race, health status, socioeconomic class, attitude about health, and expectations, as well as the size of the hospital (Aharony & Strasser, 1993; Otani & Kurz, 2004; Young, Meterko, & Desai, 2000). Factors that can be controlled and influence satisfaction with care are physical comfort, environmental noise and cleanliness, hospital food, emotional support, respect for patient preferences, efficient coordination of care, involvement of family and friends, continuity of caregivers, and the attitudes of health care providers regarding their jobs (Aharony & Strasser, 1993; Jenkinson, Coulter, Bruster, Richards, & Chandola, 2001; Otani & Kurz, 2004). There is general agreement that nursing services greatly affect patient satisfaction (Clark, Leddy, Drain, & Kaldenberg, 2007; Otani & Kurz, 2004; Press Ganey, 2013; Wagner & Bear, 2008).

**Summary**

Many studies support the idea that nurses influence a large part of patients’ experiences of care, and that interventions that improve the quality of nursing care will improve patients’ experiences. This review addressed studies of hospitalized patients’ overall experiences and
satisfaction as it relates to nurses’ communication, staff members’ responsiveness, hospitals’ physical environments, nurses’ communication about medicine, pain control, and discharges. Extensive literature about patients’ experiences shows that respectful interactions between nurses and patients that included meeting patients’ physical, emotional, and learning needs are “essential to achieving exceptional experiences” (Balik, Conway, Zipperer, and Watson, 2011, p. 12). Patients who perceive that nurses relate to them in professional, trustworthy, and caring ways report higher quality inpatient experiences (Izumi, Baggs, & Knafl, 2010; Larrabee et al., 2004; Laschinger, Hall, Pedersen, & Almost, 2005; Wagner & Bear, 2008). Furthermore, nurses who receive specific training in how to provide relationship-oriented care are more likely to give care that enhances patients’ global perceptions of quality (Woolley et al., 2012). Peplau’s (1952/1991) middle-range theory of interpersonal relations provides a framework for linking theoretical elements of patients’ experiences to nursing care.

This investigator proposed that, in addition to the four items in the “your care from nurses” section, the 12 HCAHPS survey items should reflect the contributions of nurses’ to their patients’ experiences with care. It was also proposed that the 16 items in total would correspond to elements of Peplau’s theory of interpersonal relations in nursing. If evidence of these connections is generated through research, hospitals may employ key aspects of Peplau’s (1952/1991) theory as a guide for nursing practice in order to improve patients’ experiences. Furthermore, based on the research reported, it is proposed that patients’ ratings of these 16 items will be highly correlated with patients’ global ratings of their experience, as represented by two summative HCAHPS items.
Chapter III

The Method

The two goals for this study were: (a) to use patient experience data to test Peplau’s (1952/1991) middle-range theory of interpersonal relations in nursing, and (b) to research whether nursing activities, grouped according to Peplau’s (1952/1991) theory, were significantly associated with patients’ hospital experiences. This chapter presents the study method and is organized into five sections: (a) design, (b) sample and sample size estimation, (c) data collection procedures, (d) instruments, and (e) data analysis.

Design

This was a secondary data analysis of hospital HCAHPS survey (see Appendix A) results using confirmatory factor analyses (CFAs). Confirmatory factor analysis is a type of structural equation modeling (SEM) that measures the relation of observed variables, known as indicators, to latent variables, known as factors (Aroian & Norris, 2005; Swisher, Beckstead, & Bebeau, 2004). In this study, patients’ responses to 16 HCAHPS items were the observed variables and Peplau’s (1952/1991) two phases of nurse-patient interpersonal relationships were the latent variables. Confirmatory factor analyses are appropriate for use when testing established nursing theories (DiStefano & Hess, 2005; Kääriäinen et al., 2011).

One year of survey data was used because this time period encompassed a consistent set of survey questions. These data were used to measure the relations between observed variables, 16 of the 32 items on the HCAHPS, the latent variables, Peplau’s (1952/1991) two phases of nurse-patient interpersonal relationships, working and termination, and the latent variable of integration. The ability of the two-factor model guided by Peplau’s (1952/1991) theory was compared to the seven-factor model originally derived by CMS researchers using exploratory
factor analysis of HCAHPS data. It was proposed that if the two-factor model fit the data comparably well to the seven-factor model – i.e., if the two-factor model is found to be as viable as a data-driven model – then the investigator would conduct sets of generalized linear regression models to test if the working and termination phases would each make statistically significant contributions to the prediction of overall patients’ experiences of care.

Sample

The study sample was comprised of 15,814 patients, 18 years of age and older, who had at least one overnight hospital stay and were discharged from the non-psychiatric, medical-surgical units of a large, urban, five-campus academic medical center in the mid-Atlantic region of the Eastern United States over the 2013 calendar year. Patients who were discharged to hospice care, nursing homes, skilled nursing facilities, or prisons were not included because they did not receive HCAHPS surveys. Also exempt for the same reasons were patients who were discharged directly from intensive care units and those with a foreign home address. Lastly, patients who requested on admission that the hospital not reveal that they were patients or not survey them were also exempted from the study.

The sample size was consistent with Muthén and Muthén’s (2012) recommendation for CFAs conducted using weighted least squares means and variance adjusted (WLSMV) estimation, which is used when binary and ordinal variables are analyzed (see also Beauducel & Herzberg, 2006). When structural equation models (SEMs), including CFAs, use WLSMV estimation, it is recommended that researchers estimate required sample sizes by ensuring at least 20 cases exist for each model parameter estimated. According to Jackson (2003), 200 to 400 cases should suffice for most model structures. Myers, Ahn, and Jin (2011) found that total sample sizes of 300 or more cases sufficed to achieve adequate power when the data fit their
proposed five-factor model well. This finding is not far from that recommended by Kline (2011), who, based on a review of various published SEMs, suggested using at least 200 cases for typical models. The respondents in this study represented a broad, heterogeneous population; consequently, a large variance was expected in their responses. Given the need to ensure sufficient precision to compare two models of the same data, it was proposed that at least 100 cases per latent variable, or approximately 800 cases total, would be sufficient for hypotheses testing.

The large sample size was further warranted, given that the models tested used data from a survey that employed Likert-style responses. The parametric assumptions of SEMs, including CFAs, rely on roughly normal data samples (Kline, 2011), which the limited response choices of Likert-style items can only approximate. In addition, some of the latent variables modeled in the proposed CFA of the HCAHPS survey were comprised of relatively few indicators, further arguing for a larger sample size (Samuels, 2015).

Instrument

**Consumer Assessment of Healthcare Providers and Systems – Hospital (HCAHPS) survey.**

The HCAHPS survey measures patients’ experiences with inpatient care (see Appendix A). It is the first national, standardized patient experiences survey of its kind in the US (Giordano, Elliott, Goldstein, Lehrman, & Spencer, 2010). The survey was designed to facilitate the public reporting of gathered data in aggregate form so that consumers could compare hospital scores and make informed choices (Giordano et al., 2010). Furthermore, it enables hospitals to see where their strengths and weaknesses lie with regard to patients’ experiences (Giordano et al., 2010). The HCAHPS survey can be distributed by hospitals in conjunction with commercially designed and distributed surveys.
The HCAHPS survey is based on the Consumer Assessment of Healthcare Providers and Systems (CAHPS®) survey, which was created in 1995 for use in outpatient settings (CMS, 2008). Development of the HCAHPS survey began in 2002 when the CMS and the Agency for Healthcare Research and Quality (AHRQ) worked together to create a valid, reliable questionnaire based on previous instruments that were in use in the private sector (Castle et al., 2005). The HCAHPS survey was implemented nationally in October of 2006. In fiscal year 2008, reporting of HCAHPS data became a requirement for hospitals to receive full reimbursement from CMS (Giordano et al., 2010).

The HCAHPS development process included extensive pilot testing, stakeholder input, and healthcare consumer involvement (Darby et al., 2003). The conceptual framework for the HCAHPS is the Institute of Medicine’s (IOM) domains of quality healthcare (IOM, 2001). According to Keller et al. (2005), these domains are: “(a) respect for patient’s values; (b) attention to patients’ preferences and expressed needs; (c) coordination and integration of care; (d) patient information, communication, and education; (e) physical comfort; (f) emotional support; (g) involvement of family and friends; (h) transition and continuity of care; and (i) access to care” (p. 2058). A collection of possible HCAHPS questions from a variety of sources that addressed the IOM domains was systematically evaluated for readability and content validity (Castle et al., 2005; Levine, Fowler, & Brown, 2005; O’Malley et al., 2005). Refinement of 77 initial questions reduced the number for testing to 32.

The HCAHPS instrument has 32 items. There are 21 core items that address patient experience, seven demographic items, and four questions that direct patients to skip ahead when indicated. The 21 core items load onto eight factors: (a) nurse communication, (b) physician communication, (c) responsiveness of hospital staff, (d) physical environment, (e) pain control,
(f) medication communication, (g) discharge information, and (h) care transition. A ninth factor comprised of the overall ratings of care questions is sometimes included. Exploratory factor analysis supported the nine-factor structure (Keller et al., 2005; Rothman, Park, Hays, Edwards, & Dudley, 2008). Items are in the form of questions, such as “During this hospital stay, how often did nurses listen carefully to you?” which require a response of Never, Sometimes, Usually, or Always. Some items require subjects to choose Strongly disagree, Disagree, Agree, or Strongly agree. The three structured item non-response questions may be left blank if the questions are not applicable, such as in the case of any new medications being given. In addition, subjects are asked to rate the hospital on a scale of 0-10 and to provide demographic data such as race, ethnicity, and highest grade level completed. The “hospital-level” reliability was considered to be most important by CMS and AHRQ researchers; it reflects how well patients discharged from the same hospitals agree on their assessments and levels of experiences (Keller et al., 2005). The reliability of the HCAHPS per hospital is expected to be 0.66-0.89 with a median of 0.88 as long as hospitals obtain 300 surveys or more. Reliability of greater than 0.70 is considered to be acceptable (Keller et al., 2005). Internal consistency reliabilities (0.51-0.88, median 0.72) were also considered to be acceptable (Keller et al., 2005).

Data Collection Procedures

Institutional review board exemption for this study was granted from the College of Staten Island and Columbia University. Exemption was sought because data were previously collected and de-identified; the researcher did not have access to any identifying patient information. Once these IRBs approved the study with exempt status, the investigator downloaded HCAHPS data onto a password-protected laptop computer. Because this study had no direct involvement with human subjects and was conducted on previously collected, de-
identified data, no harm to human subjects was anticipated. Research involving the study of
existing data is exempt from evaluation by an institutional review board if the information is
recorded in such a manner that the subjects cannot be identified directly or indirectly; this
standard applied to the proposed study data. Completing and returning the HCAHPS survey
implied that subjects had given consent.

The HCAHPS surveys were administered between 48 hours to six weeks after hospital
discharge to a random sample of adult patients who have had a variety of health problems; the
surveys were not restricted to Medicare beneficiaries. The surveys were administered by mail
and no incentives were offered to subjects for completion. Subjects were reassured in cover
letters that their participation was voluntary and that participation (or not) would not affect their
health benefits. They were also reassured of their privacy; surveys were prefaced with this
statement: “You may notice a number on the cover of this survey. This number is ONLY used to
let us know if you returned your survey so we don’t have to send you reminders” (Goldstein et
al., 2005, p. 1989). Subjects were provided with a toll-free number to call if they had any
questions. Hospitals may either use approved survey vendors or collect their own HCAHPS data
if approved by the Centers for Medicare and Medicaid Services (CMS) to do so. The study site
used a private company to administer the HCAHPS. More extensive details about the survey and
its protocols for data collection, coding, and file submission have been published elsewhere
(CMS, 2014).

Data Preparation and Analysis

Data were analyzed using the Statistical Package for Social Sciences (SPSS) software
version 22 (IBM Corp., 2013); for CFA, data were analyzed using Mplus, version 7.3 (Muthén &
Muthén, 2012). First, the model Chi-square, root mean square error of approximation (RMSEA),
comparative fit index (CFI), and Tucker Lewis Index (TLI) were computed for a CFA testing a model of HCAHPS items depicting the working and termination phases of Peplau’s (1952/1991) theory of interpersonal relations in nursing. These indices, called model fit statistics, predicted the strength and consistency of the hypothesized relations between the indicators and the factors (Aroian & Norris, 2005). Second, those same indices were computed in those same data for a CFA model with items arranged instead according to the original HCAHPS latent variables. Third, these indices were compared to each other.

The fourth and final step was not taken in the main analysis, because the CFA models were not sufficiently comparable. If the two-factor Peplau-guided model had been found to have been comparable, the fourth and final step was to have been to compute two sets of multiple linear regression models using maximum likelihood (generalized linear models) to test the contributions made by each of the two factors to the predictions of patients’ global ratings of care. Because the two-factor model from step two did not perform well in step three, this fourth step was not be taken. If step four had been taken, the first set of generalized linear models would have had as their outcome variable HCAHPS item 21, in which patients rated the hospital relative to the worst and best hospitals possible. The second set of generalized linear models would have had as their outcome variable HCAHPS item 22, patients’ likelihood to recommend the hospital to family or friends.

Although the fourth and final step was not taken in the main analysis, it was performed in the ancillary analysis, and it is described in more detail here. In both sets of generalized linear models, the initial linear regression model included the “physician communication” items (# 5-7) and the “about you” items (# 26-32) from the HCAHPS as predictors (Model 1) of HCAHPS item 21 and 22. The three physician-related items were summed to comprise one measure of
physician-related care. Items 27-29 were included as interval-data items, and items 26 and 31-32 were included as categorical measures. All non-categorical items, including outcome variables, were converted to $z$-scores before summation and addition to the models. The second linear regression model in both sets of models included all of the terms that comprised the initial models plus the standardized-and-summed items that comprised the orientation phase (Model 2). The third linear regression model in each set of models included all terms in the second ones as well as the items that comprised the working phase (Model 3). The fourth linear regression model in each set of models included all terms in the third ones as well as the items that comprised the termination phase (Model 4). The researcher tested the statistical significance of the differences between the nested models comparing the goodness of fit index deviances.
Chapter IV

The Results

The two goals for this study were: (a) to use patient experience data to test Peplau’s (1952/1991) middle-range theory of interpersonal relations in nursing, and (b) to research whether nursing activities, grouped according to Peplau’s (1952/1991) theory, were significantly associated with patients’ hospital experiences. The study was performed using results from a patient experience survey in a confirmatory factor analysis (CFA). Sixteen items on the Consumer Assessment of Healthcare Providers and Systems - Hospital (HCAHPS) survey (see Appendix A) were tested as indicators of two elements of Peplau’s (1952/1991) theory: (a) working with patients and (b) termination of the nurse-patient relationship. It was also hypothesized that working and termination would be highly correlated with patients’ overall ratings of their experiences, but this was not tested due to results of the initial CFA. The following sections describe data collection, sample characteristics, and distribution and reliability of the data. After this, the main analyses of data are presented.

Data Collection

A Consumer Assessment of Healthcare Providers and Systems - Hospital (HCAHPS) survey data collection took place at New York Presbyterian Hospital (NYPH), a six-campus academic medical center that employs 21,747 full time staff and has a total of 2,613 inpatient beds. In 2013, the medical center discharged 126,820 adult patients. After discharge, 80% of eligible patients aged 18 and older were received hard-copy surveys that were mailed by a private third party company, which is contracted by the Medical Center. These surveys contained the HCAHPS questions as mandated by the Center for Medicare and Medicaid Services (CMS), as well as questions about satisfaction with care. The surveys were processed
by the private company in a secure facility in South Bend, Indiana, where they were scanned and analyzed. There were 15,814 completed surveys for the year 2013.

Results of the surveys were encrypted and sent through a secure website to the manager of Patient Experience at NYPH. To protect confidentiality of data they were exported to a Microsoft 2010 Excel file and sent to the researcher as an encrypted email over a secure hospital server. The file containing survey results was kept on a single, password-protected laptop to which only the researcher had access. The Excel file was transferred to two software programs: Statistical Package for the Social Sciences (SPSS) version 22 (IBM Corp., 2013), and Mplus, version 7.3 (Muthén & Muthén, 2012). The file included only: (a) de-identified, patient-level answers to patient experience (HCAHPS) surveys, (b) patient ages, (c) patients sex, (d) patient lengths of stay, and (e) specific units from which patients were discharged.

The rate of return was calculated by dividing 80% of the number of patients discharged from each campus by the number of received surveys per campus (see Table 4.1). It is important to note that in Table 4.1, discharged patients from “Children’s Hospital” were not children; they were women aged 18 and over admitted for childbirth. Discharge information was available only for four of the five campuses, so an overall rate of return could not be estimated. However, the rates of return for the four campuses ranged from 16.09% to 22.74%. Because demographic information about all patients discharged in 2013 was not available to the researcher, it is unknown if the study sample was representative of all discharged patients. This sample size met the initial criteria of needing > 800 subjects to ensure sufficient precision to compare two models of the same data (Jackson, 2003; Kline, 2011; Myers, Ahn, & Jin, 2011). In 58 of the responses sent by the manager of patient experiences, the age of the patients was less than 18 years. These surveys were excluded due to study delimitations, leaving 15,756 (99.63%).
Table 4.1. Rate of return

<table>
<thead>
<tr>
<th>Campus</th>
<th>Number of surveys returned</th>
<th>80% of 2013 Discharges</th>
<th>% of returned surveys</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allen</td>
<td>1373</td>
<td>8528</td>
<td>16.09</td>
</tr>
<tr>
<td>Children’s Hospital</td>
<td>925</td>
<td>4373</td>
<td>21.15</td>
</tr>
<tr>
<td>Milstein Hospital</td>
<td>5512</td>
<td>26,566</td>
<td>20.74</td>
</tr>
<tr>
<td>Weill Cornell</td>
<td>7122</td>
<td>31,308</td>
<td>22.74</td>
</tr>
<tr>
<td>Lower Manhattan</td>
<td>902</td>
<td>unavailable</td>
<td>unavailable</td>
</tr>
</tbody>
</table>

**Missing data.** The following section details the types of missing data in the data set and the subsequent, related adjustments made to the data set. The HCAHPS survey has 32 items. There are 21 core items that address patient experience, seven demographic items, and four items that instruct respondents to skip ahead when indicated and not to answer questions about hospital care they did not receive. These “skip questions” create missing data that require differentiation between “missing by design” and simply “missing.” For example, question 15 asks: “During this hospital stay, were you given any medicine that you had not taken before?” If respondents answer “no” to question 15 they are directed to skip questions 16 and 17 and go to question 18. If respondents answer “no” to question 15 or leave question 15 blank but provide answers to questions 16 and 17, these answers are retained according to detailed guidelines provided for hospitals by CMS about interpreting data associated with skipped questions (CMS, 2014). If respondents answer “yes” to question 15 but fail to provide answers to questions 16 and 17, these items are coded as “missing” according to CMS guidelines (CMS, 2014).

If patients have had no experience with a topic, the survey form allows them to opt out of the question. For example, Question 4 asks respondents “During this hospital stay, after you pressed the call button, how often did you get help as soon as you wanted it?” In addition to the standard answer options (Never, Sometimes, Usually, or Always), this question offers a fifth option, “I never pressed the call button.” Question 25, which asks whether respondents had a
clear understanding of the purpose of their medications, offers a similar, fifth option, “I was not
given any medication when I left the hospital.” These are the only two core HCAHPS items
formatted this way, and they were treated similarly to skip questions.

The majority of missing HCAHPS answers on core variables (items 1-25) in the current
study were created by respondents who correctly followed the instructions to skip questions that
were not applicable to them, and during data analyses these values were considered to be
“missing by design” (see Table 4.2), which was consistent with CMS guidelines. When patients
reported that they had no experiences applicable to questions 4 and 25, these values were also
considered to be “missing by design.” Of the HCAHPS core variables, it was found that none of
the variables had more than 5.04% missing (see Table 4.2).

After recoding and evaluating the “missing by design” and other missing values, it was
found that 12,436 (78.92%) of the surveys had no missing HCAHPS core data, which CMS
defines as “applicable to all patients” (CMS, 2014, p.146). Of the 3,320 (21.07%) surveys with
missing HCAHPS core data, 125 (0.79 %) were found to be missing answers on 50% or more of
these questions. The surveys with 50% or more of these core data items missing were discarded
according to CMS guidelines, which direct hospitals or vendors to regard these surveys as “non-
response” (CMS, 2014, p.147).
Table 4.2. Missing data

<table>
<thead>
<tr>
<th>Question</th>
<th>Missing by design</th>
<th>Missing by design</th>
<th>Missing</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q01 Nurses treat with courtesy and respect</td>
<td>n/a</td>
<td>n/a</td>
<td>90</td>
<td>0.58</td>
</tr>
<tr>
<td>Q02 Nurses listen carefully</td>
<td>n/a</td>
<td>n/a</td>
<td>99</td>
<td>0.63</td>
</tr>
<tr>
<td>Q03 Nurses explain things understandably</td>
<td>n/a</td>
<td>n/a</td>
<td>113</td>
<td>0.72</td>
</tr>
<tr>
<td>Q04 Received help when pressed call button (if appropriate)</td>
<td>2831</td>
<td>18.11</td>
<td>212</td>
<td>1.36</td>
</tr>
<tr>
<td>Q05 Doctors treat with courtesy and respect</td>
<td>n/a</td>
<td>n/a</td>
<td>102</td>
<td>0.65</td>
</tr>
<tr>
<td>Q06 Doctors listen carefully</td>
<td>n/a</td>
<td>n/a</td>
<td>125</td>
<td>0.80</td>
</tr>
<tr>
<td>Q07 Doctors explain things understandably</td>
<td>n/a</td>
<td>n/a</td>
<td>167</td>
<td>1.07</td>
</tr>
<tr>
<td>Q08 Hospital room and bathroom clean</td>
<td>n/a</td>
<td>n/a</td>
<td>283</td>
<td>1.81</td>
</tr>
<tr>
<td>Q09 Hospital room area quiet at night</td>
<td>n/a</td>
<td>n/a</td>
<td>312</td>
<td>2.00</td>
</tr>
<tr>
<td>Q11 Received help with bathroom (if appropriate)</td>
<td>7049</td>
<td>45.10</td>
<td>618</td>
<td>3.95</td>
</tr>
<tr>
<td>Q13 Pain well controlled (if appropriate)</td>
<td>3802</td>
<td>24.32</td>
<td>385</td>
<td>2.46</td>
</tr>
<tr>
<td>Q14 Staff helped with pain management (if appropriate)</td>
<td>3905</td>
<td>24.98</td>
<td>415</td>
<td>2.65</td>
</tr>
<tr>
<td>Q16 Staff tell what new medicine is for (if appropriate)</td>
<td>4706</td>
<td>30.11</td>
<td>581</td>
<td>3.72</td>
</tr>
<tr>
<td>Q17 Staff describe side effects (if appropriate)</td>
<td>4751</td>
<td>30.39</td>
<td>705</td>
<td>4.51</td>
</tr>
<tr>
<td>Q19 Talk regarding help after discharge (if appropriate)</td>
<td>1130</td>
<td>7.23</td>
<td>125</td>
<td>0.80</td>
</tr>
<tr>
<td>Q20 Written info about symptoms (if appropriate)</td>
<td>1077</td>
<td>6.89</td>
<td>129</td>
<td>0.83</td>
</tr>
<tr>
<td>Q21 Rate 0 to 10</td>
<td>n/a</td>
<td>n/a</td>
<td>221</td>
<td>1.41</td>
</tr>
<tr>
<td>Q22 Recommend to family/friends</td>
<td>n/a</td>
<td>n/a</td>
<td>225</td>
<td>1.44</td>
</tr>
<tr>
<td>Q23 Took preferences into account</td>
<td>n/a</td>
<td>n/a</td>
<td>788</td>
<td>5.04</td>
</tr>
<tr>
<td>Q24 Good understanding of managing health</td>
<td>n/a</td>
<td>n/a</td>
<td>351</td>
<td>2.25</td>
</tr>
<tr>
<td>Q25 Understood purpose of medications (if appropriate)</td>
<td>2443</td>
<td>15.63</td>
<td>386</td>
<td>2.47</td>
</tr>
<tr>
<td>Q26 Admitted through the ED</td>
<td>n/a</td>
<td>n/a</td>
<td>644</td>
<td>4.12</td>
</tr>
<tr>
<td>Q27 Health</td>
<td>n/a</td>
<td>n/a</td>
<td>718</td>
<td>4.59</td>
</tr>
<tr>
<td>Q28 Mental health</td>
<td>n/a</td>
<td>n/a</td>
<td>655</td>
<td>4.19</td>
</tr>
<tr>
<td>Q29 Educational level</td>
<td>n/a</td>
<td>n/a</td>
<td>931</td>
<td>5.96</td>
</tr>
<tr>
<td>Q30 Hispanic</td>
<td>n/a</td>
<td>n/a</td>
<td>2063</td>
<td>13.20</td>
</tr>
<tr>
<td>Q31 Race</td>
<td>n/a</td>
<td>n/a</td>
<td>2,445</td>
<td>15.64</td>
</tr>
<tr>
<td>Q32 Language at home</td>
<td>n/a</td>
<td>n/a</td>
<td>1,924</td>
<td>12.31</td>
</tr>
</tbody>
</table>
Little’s (1988) test was performed on the 3,195 (20.27%) surveys retained to determine if missing data were missing completely at random (MCAR). The results of the test showed that data were not MCAR ($\chi^2 = 17289.593$, $df = 103$, $p < .001$). When data are MCAR there are no interrelations between variables and missing data are ignorable; research suggests that deleting cases would have no effect on the results of statistical tests (Allison, 2002) because they are a random subsample of the original sample (Raghunathan, 2004).

When missing data are not ignorable, such as in the current study, multiple imputation is an advanced and reliable technique supported by valid research (Tabachnick & Fidell, 2013) that should be used to replace the missing data (Graham, 2009; He, 2010). Although there is no published guidance offered by CMS regarding the use of multiple imputation for missing HCAHPS data, this has been the practice of another US health care agency, the Centers for Disease Control (Raghunathan, 2004). Thus it was attempted for this study.

However, values for missing data failed to be generated by multiple imputation attempted using Mplus, version 7.3 (Muthén & Muthén, 1998-2012), SPSS, version 22 (IBM Corp., 2013), STATA software, version 12 (StataCorp, 2011), and SAS software, version 9.4 (SAS Institute). This can sometimes occur due to the nature of the missing variables (Boehme, 2015; Samuels, 2015). To correct for missing data, complete case analysis, also known as Listwise deletion, was used (Allison, 2003). Although Listwise deletion may yield biased parameter estimates, it is acceptable for use in CFA (Allison, 2003). After Listwise deletion, 78.92% ($N = 12,436$) of the sample was retained for main analysis.
Sample Characteristics

Sample characteristics of the retained sample ($N = 12,436$) included age, sex, length of stay in the hospital, race, Hispanic ethnicity, language spoken at home, educational level, perceptions about physical and mental health, and admission through the emergency room or another route. The definitions for each of these characteristics are included in each separate section, followed by results. The sample characteristics are also reported in table format (4.3).

**Age.** Age is conceptualized as “the length of time, most often in completed years, that a given person has been alive, measured at the beginning of birth” (U.S. Census, 2013). Mean age for the total sample was 57.26 years ($SD = 19.03$, range 18-102). Mean age had a skewness of -0.143 and a kurtosis of -1.055, which reflected an approximately normal distribution. These data were provided by the hospital and are not required by the HCAHPS survey; none were missing. The patients in this sample were older than patients in the HCAHPS pilot study ($N = 19,720$) (Goldstein, Farquhar, Crofton, Darby, & Garfinkel, 2005). In the current study 30.81% ($n = 3,743$) of patients were aged 18 to 44, versus 36% ($n = 7,099$) in the pilot study; 28.34% ($n = 3,524$) of patients aged were 45 to 64 in the current study, versus 27% ($n = 5,324$) in the pilot study, and 41.56% ($n = 5,169$) of patients were aged 65 and older in the current study, versus 37% ($n = 7,296$) in the pilot study (Goldstein et al., 2005).
<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>5,268</td>
<td>42.36</td>
</tr>
<tr>
<td>Female</td>
<td>7,168</td>
<td>57.64</td>
</tr>
<tr>
<td><strong>Age (in years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 to 44</td>
<td>3,743</td>
<td>30.81</td>
</tr>
<tr>
<td>45 to 64</td>
<td>3,524</td>
<td>28.34</td>
</tr>
<tr>
<td>65 and over</td>
<td>5,169</td>
<td>41.56</td>
</tr>
<tr>
<td><strong>Length of hospital stay</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 3 days</td>
<td>7,765</td>
<td>62.44</td>
</tr>
<tr>
<td>&gt; 3 days</td>
<td>4,671</td>
<td>37.56</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>7,212</td>
<td>57.99</td>
</tr>
<tr>
<td>Hispanic</td>
<td>2,087</td>
<td>16.78</td>
</tr>
<tr>
<td>Black</td>
<td>943</td>
<td>7.58</td>
</tr>
<tr>
<td>Asian</td>
<td>1,021</td>
<td>8.21</td>
</tr>
<tr>
<td>Multiple races/ethnicities</td>
<td>139</td>
<td>1.12</td>
</tr>
<tr>
<td>Native Hawaiian/Pacific Islander</td>
<td>21</td>
<td>0.17</td>
</tr>
<tr>
<td>Native American or Alaska Native</td>
<td>39</td>
<td>0.31</td>
</tr>
<tr>
<td>Did not report</td>
<td>974</td>
<td>7.83</td>
</tr>
<tr>
<td><strong>Language spoken at home</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>8,884</td>
<td>71.44</td>
</tr>
<tr>
<td>Spanish</td>
<td>1,309</td>
<td>10.53</td>
</tr>
<tr>
<td>Chinese</td>
<td>342</td>
<td>2.75</td>
</tr>
<tr>
<td>Russian</td>
<td>141</td>
<td>1.13</td>
</tr>
<tr>
<td>Vietnamese</td>
<td>1</td>
<td>0.008</td>
</tr>
<tr>
<td>Other</td>
<td>405</td>
<td>3.26</td>
</tr>
<tr>
<td>Did not report</td>
<td>1,354</td>
<td>10.89</td>
</tr>
<tr>
<td><strong>Education level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8th grade or less</td>
<td>703</td>
<td>5.65</td>
</tr>
<tr>
<td>Some high school, did not graduate</td>
<td>690</td>
<td>5.55</td>
</tr>
<tr>
<td>High school graduate or GED</td>
<td>1,828</td>
<td>14.70</td>
</tr>
<tr>
<td>Some college/2 year college</td>
<td>2,165</td>
<td>17.41</td>
</tr>
<tr>
<td>4-year college</td>
<td>2,455</td>
<td>19.74</td>
</tr>
<tr>
<td>More than 4-year college degree</td>
<td>4,022</td>
<td>32.34</td>
</tr>
<tr>
<td>Did not report</td>
<td>573</td>
<td>4.61</td>
</tr>
<tr>
<td><strong>Admitted through the emergency department</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>4,538</td>
<td>36.49</td>
</tr>
<tr>
<td>No</td>
<td>7,521</td>
<td>60.48</td>
</tr>
<tr>
<td>Did not report</td>
<td>377</td>
<td>3.03</td>
</tr>
</tbody>
</table>
Sex. As on the US Census, the demographic descriptor for sex is meant to correspond to the biological characteristics of males and females, i.e. chromosomes, hormone levels, and anatomy (US Census, 2013). Within the sample, 42.36% \( (n = 5,268) \) identified themselves as men and 57.64% \( (n = 7,168) \) identified themselves as women. These data were provided by the hospital and are not required by the HCAHPS survey; none were missing. The sample characteristic of sex and the majority female population in the study were similar to a study by Elliott et al. (2012) which used responses from 1,971,632 surveys collected from 3,830 hospitals across the US. In this study female respondents comprised 58% \( (n = 1,147,918) \) of the sample and male respondents comprised 42% \( (n = 823,714) \).

Length of stay and admission through the emergency department. Length of stay was defined in this study as the number of days a patient stayed in the hospital, overnight and for more than 24 hours. Mean length of stay (LOS) in the hospital was 4.31 days \( (SD = 5.84, \) median 3, range 1-142). Length of stay had a skewness of 6.831 and a kurtosis of 87.08, which indicated a non-normal distribution. To correct for this, a linear transformation to reduce departure from the normal distribution was used. The transformation in its natural logarithm reduced skewness and kurtosis to .592 and .086, respectively, which reflected an approximately normal distribution. These data were provided by the hospital and are not required by the HCAHPS survey; none were missing. Length of stay data for the current study were similar to a recent study of 30,968 surveys collected at 10 different US hospitals (4.14 days, \( SD = 4.9 \) days) (Hachem et al., 2014). In a related variable, 4,538 patients (36.49%) in the current study reported that they were admitted to the hospital through the emergency department, 7,521 (60.48%) reported that they were not, and 377 patients (3.03%) did not answer this question.
**Race and ethnicity.** Race and ethnicity are required to be included on the HCAHPS survey in order to meet federal standards established by the US Office of Management and Budget’s (OMB) Directive 15 (US OMB, 1997). The race and ethnicity questions are also two of the seven demographic items used by CMS for adjusting the mix of patients across hospitals and for analytical purposes (CMS, 2014). The OMB recognizes that the definitions and categories of race and ethnicity in its standards are more cultural than scientific: “The racial and ethnic categories set forth in the standards should not be interpreted as being primarily biological or genetic in reference. Race and ethnicity may be thought of in terms of social and cultural characteristics as well as ancestry” (US OMB, 1997). Despite the scant biologic relevance to these concepts (Shwartz, 2001), these data are still collected because of their significance to society and their relevance with regard to population health and disparities (National Institutes of Health, 2014).

The races of the sample as surveyed by question 31 were Non-Hispanic White (57.99%, n = 7,212), Asian (8.21%, n = 1,021), Black or African American (7.58%, n = 943), multiple races or ethnicities (1.12%, n = 139), Pacific Islander or Native Hawaiian (0.17%, n = 21), and Native American or Alaska Native (0.31%, n = 39). Of the patients surveyed, 7.83% (n = 974) did not report race. For question 30, of the 2,087 (16.78% of the total survey) patients who identified themselves as Hispanic, 11.77% (n= 1,464) of the total survey answered “Yes, other Spanish/Hispanic/Latino,” 3.85% (n = 479) of the total survey answered, “Yes, Puerto Rican” 0.80% (n = 99) of the total survey answered “Yes, Cuban,” and 0.64% (n = 79)of the total survey answered “Yes, Mexican/Mexican American/Chicano.” Data on this variable were either “missing by design” (n = 9,017, 72.51%) because Black, Non-Hispanic White, and Asian patients answered “No, not Spanish/Hispanic/Latino” or missing (n = 1,298, 10.44%). Of the
total number of patients identifying with a specific Hispanic ethnicity \((n = 2,087)\), 995 patients identified themselves as White in question 31, 222 identified themselves as Black, 21 as Asian, 43 as multiple races, 40 as Pacific Islander, and 40 as Native American.

In a study of surveys from 1,203,229 patients from 2,684 hospitals across the US (see Table 4.4), Goldstein et al. (2010) found that the majority of respondents were Non-Hispanic White patients \((79.28\%, n = 953,987)\). In the current study, Non-Hispanic White patients were a majority, but a smaller one \((57.99\%, n = 7,212)\). The percentage of Black or African American patients \((7.58\%, n = 943)\) in the current study was similar to the Goldstein et al. (2010) study \((7.11\%, n = 85,564)\), as was the percentage of multiple race or ethnicity patients \((1.12\%, n = 139 \& 1.29\%, n = 15,537, respectively)\). However, Hispanic patients in the current study \((16.78\%, n = 2,087)\) comprised a larger percentage than in the Goldstein et al. (2010) study \((6.92\%, n = 83,283)\), as did Asian and Pacific Islander/Native Hawaiian patients \((8.38\%, n = 1,042 \& 1.83\%, n = 22,106\) respectively. Native American or Alaska Native patients comprised < 1% of both studies; however, the Goldstein et al. (2010) had fewer missing data in the race/ethnicity variable than did the current study \((2.91\%, n = 35,111 \text{ versus } 6.90\%, n = 858)\).

**Table 4.4. Race and Ethnicity comparisons**

<table>
<thead>
<tr>
<th></th>
<th>Goldstein et al.</th>
<th>Current Study</th>
<th>Manhattan</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n)</td>
<td>(n%)</td>
<td>(n)</td>
<td>(n%)</td>
</tr>
<tr>
<td>White</td>
<td>7212</td>
<td>57.99</td>
<td>766,114</td>
<td>47.11</td>
</tr>
<tr>
<td>Hispanic</td>
<td>2087</td>
<td>16.78</td>
<td>419,398</td>
<td>25.79</td>
</tr>
<tr>
<td>Black</td>
<td>943</td>
<td>7.58</td>
<td>208,313</td>
<td>12.81</td>
</tr>
<tr>
<td>Asian</td>
<td>1021</td>
<td>8.21</td>
<td>184,710</td>
<td>11.35</td>
</tr>
<tr>
<td>Multiple races/ethnicities</td>
<td>139</td>
<td>1.12</td>
<td>31,992</td>
<td>1.96</td>
</tr>
<tr>
<td>Native Hawaiian/Pacific Islander</td>
<td>21</td>
<td>0.17</td>
<td>1,782</td>
<td>0.10</td>
</tr>
<tr>
<td>Native American or Alaskan</td>
<td>39</td>
<td>0.31</td>
<td>2,528</td>
<td>0.15</td>
</tr>
<tr>
<td>Did not report</td>
<td>974</td>
<td>7.83</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

* not supplied
The differences in race and ethnicity in the current study, when compared to studies conducted using nation-wide HCAHPS data, may be evaluated by demographics of the borough of Manhattan, which in 2013 were more similar to the demographics of the current study (U.S. Census Bureau, 2013b) then they were to Goldstein et al. (2010). However, the demographics in the current study also resembled the demographics of the general US population (U.S. Census Bureau, 2013c) somewhat more than they resembled the Goldstein et al. (2010) data (see Table 4.4). This may be because of the changing demographics of the US population with regard to Hispanic and Asian residents (Colby & Ortman, 2015), and the fact that the Goldstein et al. (2010) study was done using some of the first HCAHPS data, which were collected almost ten years ago. Another contributing factor may be that the hospital market share is not limited only to the borough of Manhattan.

**Language at home.** The language question, “What language do you mainly speak at home?” is similar to questions about home language on the US Census, which is assessed in order to measure the percentage of the population that may need help in understanding English (Ryan, 2013). The language question on the HCAHPS survey is one of the seven demographic items that are used by CMS for adjusting the mix of patients across hospitals and for analytical purposes (CMS, 2014). With regard to language mainly spoken at home, 71.44% \( (n = 8,884) \) of the sample spoke English, 10.53% \( (n = 1,309) \) spoke Spanish, 2.75% \( (n = 342) \) spoke Chinese, and 1.13% spoke Russian \( (n = 141) \). One patient \( (0.01\%) \) in the sample spoke mainly Vietnamese at home, 405 \( (3.26\%) \) patients spoke “some other language,” and 1,354 \( (10.89\%) \) patients did not provide answers to this question.

The sample characteristics of language spoken at home, educational level, and perceptions about physical and mental health are frequently not reported in studies using
HCAHPS data, or are reported in aggregate forms. For example, Elliott et al. (2012) list only data for “Non-English Primary Language” in the demographics section (Elliott et al., 2012, p. 1487), rather than any of the six language options. Rothman et al. (2008) does report that 8% (n = 3,214) of a sample of 40,172 patients from 186 California hospitals spoke mainly Spanish at home. This number is fewer than those patients in the current study (10.53%, n = 1,309) who spoke mainly Spanish at home, and also fewer than those residents age 5 and older in the general US population (12.89%, n = 37,579,787) (Ryan, 2013) who spoke mainly Spanish at home. However none of these percentages approached the 23.07% (n = 347,033) of the borough of Manhattan residents who spoke mainly Spanish at home (US Census Bureau, 2013c). The low percentage of patients who reported speaking mainly Spanish at home in the current study may be attributable to the low response rate or the under-represented Hispanic population in the study when compared to the demographics of the borough.

**Educational level.** As on the U.S. Census, educational achievement is measured by degree status rather than years of schooling, because the former is a more direct way of measuring academic achievement (U.S. Census, 2013). The educational level question on the HCAHPS survey is one of the seven demographic items that are used by CMS for adjusting the mix of patients across hospitals and for analytical purposes (CMS, 2014). Regarding educational level, the largest proportion of the sample had more than a four-year college degree (32.34%, n = 4,022). A smaller percentage had a four-year college degree only (19.74%, n = 2,455), and a still smaller proportion had some college or a two-year degree (17.41%, n = 2,165). The number of patients reporting a high school diploma or General Education Diplomas (GEDs) was 1,828 (14.70%), the number of patients reporting some high school was 690 (5.55%), and the number
of patients reporting eighth grade or less was 703 (5.65%). Of this sample, 4.61% (n = 573) did not provide answers to questions about educational level.

In three studies by Elliot et al., (2009, 2010, & 2012), a total of 3,194,581 survey responses are listed. The patients in the Elliot et al. (2009, 2010, & 2012) studies reported lower educational levels than did the patients in the current study. Educational levels in the current study versus those same levels in the Elliott et al., (2009, 2010, & 2012) studies are listed here, with a range of percentages used for the Elliot studies. The largest proportion of the current study sample had more than a four-year college degree (32.34%, n = 4,022), versus 11-15% in the Elliot studies. A smaller percentage of the current study sample had a four-year college degree only (19.74%, n = 2,455), versus 9-12% in the Elliot studies. A still smaller proportion of the current study sample had some college or two-year degrees (17.41%, n = 2,165), versus 27-29% in the Elliott studies. The number of patients reporting high school diplomas or GEDs only in the current study sample was 1,828 (14.70%), versus 29-36% in the Elliott studies. The number of patients in the current study sample reporting some high school was 690 (5.55%), versus 10-11% in the Elliot studies. And the number of patients in the current study sample reporting eighth grade or less was 703 (5.65%), versus 6-7% in the Elliott studies.

The current study sample also reported higher education levels than the 2009 US population: 10.3% (n = 20,841,287) of US residents had more than a four-year college degree, 17.6% (n = 35,494,367) had a four-year college degree only, 22.5% (n = 45,438,444) had some college or two-year degrees only, 28.5% (n = 57,551,671) had high school diplomas or graduate-equivalent degrees (GEDs) only, 8.5% (n = 17,144,287) had some high school only, and 5.0% (n = 10,048,130) had eighth grade or less (Ryan & Siebens, 2012). However, the current study was more similar to the population of the borough of Manhattan, where 34.33% of residents had
more than a four-year college degree, 20.51% of residents had a four-year college degree only, 14.1% had some college or two-year degrees, 16.7% had high school diplomas or GEDs, and 13.9% reported less than a high school degree (U.S. Census Bureau, 2013c).

**Perceptions about physical and mental health.** The questions about physical and mental health on the HCAHPS are similar but not identical to questions asked on the National Health Interview Survey, which is conducted by the U.S. Census Bureau and the National Center for Health Statistics, which is part of the Centers for Disease Control and Prevention (CDC, 2014). The questions about physical and mental health on the HCAHPS survey are two of the seven demographic items that are used by CMS to adjust the mix of patients across hospitals and for analytical purposes (CMS, 2014). Regarding perceptions about physical health, 28.39% (n = 3,531) reported very good physical health, 27.74% (n = 3,450) of the sample reported good physical health, and 20.72% (n = 2,577) reported excellent physical health. A smaller portion of the sample perceived their physical health to be fair (15.76%, n = 1,961) or poor (3.89%, n = 484). For this variable, 3.48% (n = 433) of the patients’ answers were missing. Additionally, 38.25% (n = 4,758) of the sample rated their overall mental or emotional health as excellent and 30.69% (n = 3,817) very good, while a minority of the sample felt their mental health was only good (19.17%, n = 2,385), fair (5.18%, n = 645), or poor (1.19%, n = 149). For this variable, 3.07% (n = 382) of the patients’ answers were missing.

Rothman et al. (2008) reported on perceptions about physical health status using HCAHPS data; respondents in the current study sample generally perceived themselves to be in better physical health than those in the Rothman study. In the current sample, 20.72% (n = 2,577) reported that they were in excellent health, whereas in the Rothman et al. (2008) sample only 16% (n = 6,428) reported this finding. Additionally, in the current sample versus the
Rothman et al. (2008) sample, 28.39% \((n = 2,577)\) versus 28% \((n = 11,248)\) reported very good health, 27.74% \((n = 3,450)\) versus 30% \((n = 12,051)\) reported good health, 15.76% \((n = 1,961)\) versus 19% \((n = 7,632)\) reported fair health, and 3.89% \((n = 484)\) versus 7% \((n = 2,812)\) reported poor health. For this demographic, the current sample was more reflective of the HCAHPS pilot study, as reported by Elliot, Kanouse, Edwards, & Hilborne (2009). In the pilot study, 21% \((n = 4,021)\) reported excellent health, 30% \((n = 5,696)\) reported very good health, 29% \((n = 5,518)\) reported good health, 17% \((n = 3,173)\) reported fair health, and 4% \((n = 801)\) reported poor health. The findings of the current study (conducted in New York City) were closer to those of the pilot study than the California-based Rothman et al. (2008), perhaps because New York was one of the three states where the HCAHPS survey was piloted, along with Maryland and Arizona (Elliott et al., 2009). Approximately 44% \((n = 8,677)\) of the patients in the pilot study were from New York (Goldstein, Farquhar, Crofton, Darby, & Garfinkel, 2005).

In the published reports reviewed for this study, no information is given on patient-reported perceptions about their own mental health. This includes reports about the pilot study (Darby & the CAHPS® II Investigators, 2003; Elliott et al., 2009; Goldstein, et al., 2005; O’Malley et al., 2005b).

**Deleted cases.** The 3,320 (21.07%) deleted surveys showed significant differences on some demographic variables compared to surveys without missing data. To determine differences, Student’s t-tests were used for continuous variables (age, perceptions about physical and mental health, and educational levels) and cross-tabulation Chi-Squares were employed for categorical variables (race and ethnicity, language spoken at home, and LOS). The results showed that patients whose surveys were deleted due to incompleteness were more likely to be older, with a LOS of only one day, Black or Hispanic or of multiple race, mainly Spanish-
speaking at home, less well-educated, and reporting of lower levels of physical and mental health (see Table 4.5). This finding is partly in keeping with the HCAHPS pilot study data that noted non-White patients had higher rates of missing data, and that women and patients with a LOS of either one day only or more than 15 days were more likely to have missing data. (Darby & the CAHPS® II Investigators, 2003).

**Table 4.5. Deleted Cases**

<table>
<thead>
<tr>
<th></th>
<th>Non-missing</th>
<th>Missing</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>*<em>Sex, % (Adj. Res.)</em></td>
<td></td>
<td></td>
<td>0.196</td>
</tr>
<tr>
<td>Men</td>
<td>42.36 (1.3)</td>
<td>41.02 (-1.3)</td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>57.64 (-1.3)</td>
<td>58.89 (1.3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>57.25</td>
<td>64.34</td>
<td></td>
</tr>
<tr>
<td><strong>Age, Mean (SD)</strong>**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(19.02)</td>
<td>(18.21)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td><strong>Ethnicity, % (Adj. Res.)</strong>*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>62.90 (3.2)</td>
<td>59.55 (-3.2)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Black</td>
<td>8.23 (-4.0)</td>
<td>10.64 (4.0)</td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>8.91 (3.0)</td>
<td>7.10 (-3.0)</td>
<td></td>
</tr>
<tr>
<td>Pacific</td>
<td>0.18 (0.4)</td>
<td>0.15 (-0.4)</td>
<td></td>
</tr>
<tr>
<td>Native</td>
<td>0.12 (0.7)</td>
<td>0.07 (-0.7)</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>18.12 (-2.7)</td>
<td>20.39 (2.7)</td>
<td></td>
</tr>
<tr>
<td>Multiple</td>
<td>1.54 (-2.1)</td>
<td>2.10 (2.1)</td>
<td></td>
</tr>
<tr>
<td><strong>Language, % (Adj. Res.)</strong>*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>80.17 (3.9)</td>
<td>76.76 (-3.9)</td>
<td></td>
</tr>
<tr>
<td>Spanish</td>
<td>11.81 (-6.1)</td>
<td>16.16 (6.1)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Chinese</td>
<td>3.09 (2.5)</td>
<td>2.18 (-2.5)</td>
<td></td>
</tr>
<tr>
<td>Russian</td>
<td>1.27 (-0.2)</td>
<td>1.32 (0.2)</td>
<td></td>
</tr>
<tr>
<td>Vietnamese</td>
<td>0.01 (-1.1)</td>
<td>0.04 (1.1)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>3.65 (0.3)</td>
<td>3.54 (0.3)</td>
<td></td>
</tr>
<tr>
<td><strong>Education, Mean (SD)</strong>**</td>
<td>4.44 (1.51)</td>
<td>4.00 (1.66)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>25.44 (-2.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LOS, % (Adj. Res.)</strong>*</td>
<td></td>
<td></td>
<td>&lt;.001</td>
</tr>
<tr>
<td>1 day</td>
<td>10.4</td>
<td>34.49 (10.4)</td>
<td></td>
</tr>
<tr>
<td>2-14 days</td>
<td>70.55 (9.1)</td>
<td>62.35 (-9.1)</td>
<td></td>
</tr>
<tr>
<td>&gt;14 days</td>
<td>4.00 (2.2)</td>
<td>3.16 (-2.1)</td>
<td></td>
</tr>
<tr>
<td><strong>Physical health, mean (SD)</strong>**</td>
<td>2.52 (1.12)</td>
<td>2.75 (1.14)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td><strong>Mental Health, mean (SD)</strong>**</td>
<td>2.00 (1.01)</td>
<td>2.16 (1.07)</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

* Cross-tabulation and chi square
** Student's t test
Adj. Res. = adjusted standardized residual
Distribution and Reliability of the Data

The distribution and reliability of the 21 core HCAHPS items included in the main analyses \((N = 12,436)\) are reported in this section. Distribution of the data was evaluated using skewness and kurtosis. Reliability was estimated using Cronbach’s alpha and ordinal alpha.

**Distribution.** Survey scores in this study were not normally distributed. Variables can be considered normally distributed if the skewness and kurtosis are close to zero (Tabachnick & Fidell, 2013). The skewness and kurtosis of this sample indicate that the variables were not normally distributed; the scores were high and extremely skewed with a strong ceiling effect (see Table 4.6). Testing for normality was done using Fisher’s Test, which showed that all the variables were statistically significantly kurtosed \((> |1.96|)\). Further testing for normality was done using the Kolmogorov-Smirnov test, which was significant for all the variables at <0.001. Both tests supported that the variables were not normally distributed. Patient answers and median scores are supplied in Table 4.6 to help illustrate the skewed distribution of the variables. The statistically significant kurtosis of the variables did not affect the CFA because the variables were treated as ordinal, and weighted least squared means and variance estimation accounts non-normally distributed variables.

**Reliability.** Reliability of the survey was questionable. Cronbach’s alpha (Nunnally & Bernstein, 1994), an estimate of the reliability of psychometric tests, has been reported previously for the HCAHPS survey (e.g. Rothman et al, 2008; Weiss, Yaksheva, & Bobay, 2011; Westbrook, Babakus, & Grant, 2014). Cronbach’s alphas are based on Pearson’s coefficient. For the current study, Cronbach’s alpha and ordinal alphas were used. Ordinal alphas, based on polychoric correlations rather than Pearson’s coefficient, have recently been supported as more accurate tests of reliability for ordinal survey data (Gadermann, Guhn, &...
Table 4.6. HCAHPS scores, medians, skewness and kurtosis

<table>
<thead>
<tr>
<th>Q01.</th>
<th>Never</th>
<th>Sometimes</th>
<th>Usually</th>
<th>Always</th>
<th>Median</th>
<th>Skewness (SE)</th>
<th>Kurtosis (SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.26</td>
<td>3.09</td>
<td>14.17</td>
<td>82.49</td>
<td>4</td>
<td>-2.45 (.022)</td>
<td>5.89 (.044)</td>
</tr>
<tr>
<td>Q02.</td>
<td>0.42</td>
<td>4.68</td>
<td>22.20</td>
<td>72.70</td>
<td>4</td>
<td>-1.72 (.022)</td>
<td>2.50 (.044)</td>
</tr>
<tr>
<td>Q03.</td>
<td>0.75</td>
<td>4.33</td>
<td>20.53</td>
<td>74.40</td>
<td>4</td>
<td>-1.93 (.022)</td>
<td>3.58 (.044)</td>
</tr>
<tr>
<td>Q04.</td>
<td>1.78</td>
<td>11.07</td>
<td>30.95</td>
<td>56.19</td>
<td>4</td>
<td>-1.10 (.024)</td>
<td>0.45 (.048)</td>
</tr>
<tr>
<td>Q05.</td>
<td>0.33</td>
<td>2.10</td>
<td>10.09</td>
<td>87.48</td>
<td>4</td>
<td>-3.19 (.022)</td>
<td>11.05 (.044)</td>
</tr>
<tr>
<td>Q06.</td>
<td>0.50</td>
<td>3.63</td>
<td>14.22</td>
<td>81.65</td>
<td>4</td>
<td>-2.45 (.022)</td>
<td>6.00 (.044)</td>
</tr>
<tr>
<td>Q07.</td>
<td>0.69</td>
<td>3.32</td>
<td>17.09</td>
<td>78.90</td>
<td>4</td>
<td>-2.29 (.022)</td>
<td>5.39 (.044)</td>
</tr>
<tr>
<td>Q08.</td>
<td>2.03</td>
<td>7.82</td>
<td>23.72</td>
<td>66.43</td>
<td>4</td>
<td>-1.57 (.022)</td>
<td>1.87 (.044)</td>
</tr>
<tr>
<td>Q09.</td>
<td>4.36</td>
<td>11.84</td>
<td>31.15</td>
<td>52.65</td>
<td>4</td>
<td>-1.09 (.022)</td>
<td>0.39 (.044)</td>
</tr>
<tr>
<td>Q11.</td>
<td>6.06</td>
<td>11.26</td>
<td>22.70</td>
<td>59.98</td>
<td>4</td>
<td>-1.28 (.030)</td>
<td>0.55 (.060)</td>
</tr>
<tr>
<td>Q13.</td>
<td>1.65</td>
<td>6.29</td>
<td>28.02</td>
<td>64.04</td>
<td>4</td>
<td>-1.50 (.025)</td>
<td>1.93 (.050)</td>
</tr>
<tr>
<td>Q14.</td>
<td>1.24</td>
<td>4.99</td>
<td>18.28</td>
<td>75.49</td>
<td>4</td>
<td>-2.07 (.025)</td>
<td>4.07 (.051)</td>
</tr>
<tr>
<td>Q16.</td>
<td>2.52</td>
<td>6.23</td>
<td>15.41</td>
<td>75.84</td>
<td>4</td>
<td>-2.10 (.027)</td>
<td>3.80 (.053)</td>
</tr>
<tr>
<td>Q17.</td>
<td>19.59</td>
<td>13.16</td>
<td>20.65</td>
<td>46.60</td>
<td>3</td>
<td>-0.62 (.027)</td>
<td>-1.17 (.053)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q19.</th>
<th>23.20</th>
<th>76.80</th>
<th>4*</th>
<th>Skewness (SE)</th>
<th>Kurtosis (SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1*</td>
<td></td>
</tr>
<tr>
<td>Q20.</td>
<td>10.16</td>
<td>89.84</td>
<td></td>
<td>1*</td>
<td></td>
</tr>
</tbody>
</table>

| Q23. | 2.00  | 4.99     | 46.53   | 46.48  | 3      | -1.01 (.022)  | 1.34 (.044)   |
| Q24. | 1.25  | 2.54     | 39.87   | 56.34  | 4      | -1.19 (.022)  | 1.89 (.044)   |
| Q25. | 1.94  | 2.00     | 32.10   | 63.96  | 4      | -1.69 (.024)  | 3.51 (.048)   |

| Q22. | 1.6   | 2.5      | 15.6    | 80.3   | 4      | -2.44 (.022)  | 7.49 (.044)   |

| Q21. | 0.52  | 0.35     | 0.46    | 0.69   | 2.03   | 5.64         | 11             |

*mode
Only five of the nine Cronbach’s alpha coefficients were greater than 0.7 (see Table 4.7), which is the acceptable level according to Nunnally and Bernstein (1994). Using ordinal alpha, six of the nine ordinal alpha coefficients were greater than 0.7, which is acceptable reliability (Gadermann, Guhn, & Zumbo, 2012). The following paragraphs explain why ordinal alpha was examined in addition to the more traditional Cronbach’s alpha.

**Table 4.7. Reliability estimates for HCAHPS latent factors**

<table>
<thead>
<tr>
<th>Measure (type)</th>
<th>Question</th>
<th>Cronbach’s α</th>
<th>Ordinal α</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Nurse communication</td>
<td>Q01. Nurses treat with courtesy and respect</td>
<td>0.85</td>
<td>0.93</td>
</tr>
<tr>
<td></td>
<td>Q02. Nurses listen carefully</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q03. Nurses explain things understandably</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Physician communication</td>
<td>Q05. Doctors treat with courtesy and respect</td>
<td>0.85</td>
<td>0.94</td>
</tr>
<tr>
<td></td>
<td>Q06. Doctors listen carefully</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q07. Doctors explain things understandably</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Staff Responsiveness</td>
<td>Q04. Received help when pressed call button</td>
<td>0.58</td>
<td>0.71</td>
</tr>
<tr>
<td>4. Hospital environment</td>
<td>Q08. Hospital room and bathroom clean</td>
<td>0.51</td>
<td>0.62</td>
</tr>
<tr>
<td></td>
<td>Q09. Hospital room area quiet at night</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Pain Management</td>
<td>Q13. Pain well controlled</td>
<td>0.81</td>
<td>0.91</td>
</tr>
<tr>
<td></td>
<td>Q14. Staff helped with pain management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Communication about medicine</td>
<td>Q16. Staff tell what new medicine is for</td>
<td>0.66</td>
<td>0.81</td>
</tr>
<tr>
<td></td>
<td>Q17. Staff describe side effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Discharge information</td>
<td>Q19. Talk regarding help after discharge</td>
<td>0.35</td>
<td>0.59</td>
</tr>
<tr>
<td></td>
<td>Q20. Written info about symptoms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Care transition</td>
<td>Q23. Took preferences into account</td>
<td>0.79</td>
<td>0.88</td>
</tr>
<tr>
<td></td>
<td>Q24. Understanding of managing health</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Q25. Understood purpose of medications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Hospital rating</td>
<td>Q21. Rate on scale of 0 to 10</td>
<td>0.88</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td>Q22. Recommend to family/friends</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Although researchers frequently Likert-response format items as continuous data, in the current study, Likert-response format items were considered to be ordinal data, as recommended by Rhemtulla, Brosseau-Liard, and Savalei (2012) and Gadermann, Guhn, and Zumbo (2012). It was also more appropriate to treat these data as ordinal because HCAHPS items have at most only four response choices. Five or more response choices are needed to attempt to interpret
Likert-response format items as continuous variables (Rhemtulla, 2012). Cronbach’s alphas were also performed to offer comparisons to a more well-known assessment of reliability.

It is important to note that for instances in which Cronbach’s and ordinal alphas were lower, the number of indicators or items used in these statistical tests was fewer than three. Indicators are the number of coefficients that make up a latent variable. When indicators are fewer than three, the coefficients may have a lower reliability (Gliem & Gliem, 2003). Ordinal alpha was not performed for the indicator entitled, “Hospital rating,” because Q21, “Rate on scale of 0 to 10” has ten possible categories (9 and 10 were collapsed to form a single category) and if a variable has more than eight categories, polychoric correlations cannot be performed. Additionally, Gadermann et al. (2012) state that with more than eight categories, the alpha coefficients obtained using Pearson’s coefficient (Cronbach’s) and those obtained using polychoric correlations (Ordinal) are most likely the same. In the Main Analysis section, the Confirmatory Factor Analysis (CFA) provides a more detailed explanation of how well the latent factors were measured by the observed indicators.

**Main Analyses**

Confirmatory factor analyses were executed on the specified subsets of the HCAHPS core measures to test Peplau’s (1952/1991) theory of interpersonal relations in nursing, and the resultant models performed sufficiently well. It was proposed that 16 items on the HCAHPS survey could be tested as indicators of two elements of Peplau’s (1952/1991) theory. Two factors derived from the theory were tested: (a) working with patients and (b) termination of the nurse-patient relationship. It was further hypothesized that the two factors of working and termination would be highly correlated with patients’ overall ratings of their experiences. Before CFAs were performed, sample size was examined to ensure that there were enough patients to
create stable models. Using Mplus version 7.3 (Muthén & Muthén, 1998-2012), it was determined that there were 61 free parameters, which are defined as estimates of variance and residual variance of the latent factors and observed variables, and correlation between the latent factors. It was then determined that there were 230.34 observations for each free parameter, which was well above the accepted guidelines of 10 patients per free parameter recommended by Schreiber, Nora, Stage, Barlow, and King (2006) and also above the more conservative recommendation of 20 free parameters suggested by Tanaka (1987).

**Hypothesis 1a:** A CFA of HCAHPS data will find a statistically significant fit of a Peplau-guided model in which items 1, 2, 3, 4, 8, 9, 11, 13, 14, 16, and 17 comprise a working phase latent variable and items 19, 20, 23, 24, & 25 comprise a termination phase latent variable. Hypothesis 1a was supported, that is, a CFA testing a two factor model based on the working and termination phases of Peplau’s (1952/1991) theory of interpersonal relations in nursing performed sufficiently well. Loadings were standardized, meaning that the StdYX standardization procedure in Mplus version 7.3 (Muthén & Muthén, 1998-2012) was used to create a common frame of reference so that factor loading values could be compared. This was necessary because of the differing question formats on the HCAHPS survey, where two, four, or eleven answers are possible depending on the question. Outliers were tested using Cook’s Distance and none were identified ($D < 1.00$; range 0.21-0).

All items loaded onto their hypothesized factors (see Table 4.8). The lowest loading was .490 and the highest was .903. All loadings were significant at $p < .0001$. On Table 4.8 the loadings for HCAHPS questions 23, 24, and 25 are negative numbers. This is because the answer options for questions 19 and 20 are “yes/no,” and the answer options for 23, 24, and 25 are “strongly disagree, disagree, agree, and strongly agree.” When the answer of “yes” and
“strongly disagree” are loaded correctly into Mplus version 7.3 (Muthén & Muthén, 1998-2012). Their values are opposed: a “strongly agree” answer would be equivalent to a “yes” answer. However, their values are reversed due to their position in the answer selection array. It is important to note that the negative or positive values do not affect the factor loadings. The reliability of the two-factor model was acceptable for the working phase’s Cronbach’s alpha (0.85), questionable for the termination phase’s Cronbach’s alpha (0.65), and acceptable for both phases with regard to ordinal alpha (working = 0.92, termination = 0.72).

Table 4.8. Factor loadings for a CFA testing a model of HCAHPS items and Peplau’s theory*

<table>
<thead>
<tr>
<th>HCAHPS items</th>
<th>Working phase factor loading</th>
<th>Termination phase factor loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q01. Nurses treat with courtesy and respect</td>
<td>0.898</td>
<td>-</td>
</tr>
<tr>
<td>Q02. Nurses listen carefully</td>
<td>0.903</td>
<td>-</td>
</tr>
<tr>
<td>Q03. Nurses explain things understandably</td>
<td>0.832</td>
<td>-</td>
</tr>
<tr>
<td>Q04. Received help when pressed call button</td>
<td>0.698</td>
<td>-</td>
</tr>
<tr>
<td>Q08. Room and bathroom kept clean</td>
<td>0.606</td>
<td>-</td>
</tr>
<tr>
<td>Q09. Hospital room area quiet at night</td>
<td>0.515</td>
<td>-</td>
</tr>
<tr>
<td>Q11. Received help with bathroom</td>
<td>0.586</td>
<td>-</td>
</tr>
<tr>
<td>Q13. Pain well controlled</td>
<td>0.761</td>
<td>-</td>
</tr>
<tr>
<td>Q14. Staff helped with pain management</td>
<td>0.860</td>
<td>-</td>
</tr>
<tr>
<td>Q16. Staff tell what new medicine is for</td>
<td>0.711</td>
<td>-</td>
</tr>
<tr>
<td>Q17. Staff describe side effects</td>
<td>0.677</td>
<td>-</td>
</tr>
<tr>
<td>Q19. Talk regarding help after discharge</td>
<td>-</td>
<td>0.490</td>
</tr>
<tr>
<td>Q20. Written info about symptoms</td>
<td>-</td>
<td>0.581</td>
</tr>
<tr>
<td>Q23. Took preferences into account</td>
<td>-</td>
<td>-0.868</td>
</tr>
<tr>
<td>Q24. Good understanding of managing health</td>
<td>-</td>
<td>-0.900</td>
</tr>
<tr>
<td>Q25. Understood purpose of medications</td>
<td>-</td>
<td>-0.763</td>
</tr>
</tbody>
</table>

* all factor loading significant at \( p < .0001 \)

The CFA model is presented in Figure 4.1, in which ovals represent the two latent variables, working and termination, and squares represent observed variables, which are the HCAHPS items. Factor loadings are listed on the arrows that go from the latent variables to the observed variables. Correlation between the two latent variables is expressed as Pearson’s \( r \).
coefficient (.693, p < .001), listed on the arrow to the left of the figure that goes between the two latent variables. The two factors are highly correlated.

**Figure 4.1.** CFA Peplau model
Indicators of the two factor structure model fit were acceptable. The root mean square error of approximation (RMSEA) was 0.071, 90% CI (0.069 - 0.072), and the calculated probability of the population RMSEA to be lower than 0.05 was < 0.001. Browne and Cudeck (1993) note that larger values for RMSEA indicate worse model fit; ideally, RMSEA values are not significantly different from zero. A RMSEA score of 0.01 is considered excellent, 0.05 good, and 0.08 mediocre (Browne & Cudeck, 1993; Kenny, 2014). The current score of 0.07 is within the good to mediocre score range of 0.05 to 0.08. Values larger than 0.10 indicate poorly fitting models, but values from 0.05 to 0.08 “represent reasonable errors of approximation in the population” (Byrne, 2012, p. 73). In addition, models with low numbers of subjects can have artificially large values for the RMSEA (Kenny, 2014), so the large sample size of the present study (N = 12,436) protects against inflation of the current RMSEA. Furthermore, the narrow width of the confidence interval indicates that the RMSEA is accurate (Kenny, 2014).

The comparative fit index (CFI) was 0.953, above the recommended 0.95 standard for excellent (Hu & Bentler, 1999). The Tucker Lewis Index (TLI) was 0.945, which was not above the recommended 0.95 standard for excellent. However, CFI and TLI are usually considered acceptable when greater than 0.90 (Hu & Bentler, 1999), and the TLI value of 0.945 was considered adequate.

The Chi-Square is another method for evaluating model fit; however, in this study, the Chi-square was artificially significant ($\chi^2 = 6501.751, df = 103, p < .001$). Kenny (2014) notes that when models have more than 400 cases the Chi-Square will almost always be statistically significant and thus may not contribute to estimation of model fit. According to Hooper, Coughlan, and Mullen (2008), “because the Chi-Square statistic is in essence a statistical significance test it is sensitive to sample size which means that the Chi-Square statistic nearly
always rejects the model when large samples are used” (p. 54). The RMSEA value is the preferred fit index because it is able to correct for large sample sizes (Hooper, Coughlan, &-Mullen, 2008). Additionally, the Chi-Square will have too many Type-1 errors when the variables are not normally distributed (DiStefano & Hess, 2005; Kenny, 2014; Ullman, 2006). Since this sample size is large ($N = 12,436$) and as responses to the HCAHPS questions were extremely skewed, the Chi-Square was considered to be inappropriate as an estimate of model fit.

**Hypothesis 1b: A CFA of HCAHPS data will support the previous exploratory factor analyses done by CMS that found a nine-factor structure for the HCAHPS.**

Hypothesis 1b was supported, that is, CFA of the same study data used to test the Peplau (1952/1991) theory showed that the previous nine-factor structure established by CMS performed extremely well. All items loaded onto their anticipated latent factors (see Table 4.9). Outliers were tested using Cook’s Distance and none were identified ($D < 1.00$; range 0.16-0). Overall indicators of the nine-factor structure model fit were excellent. The RMSEA was 0.027, 90% CI (0.024, 0.028), which was below the cutoff of 0.05 for a good model fit (Browne & Cudeck, 1993). The calculated probability that the true RMSEA value was < 0.05 was 1.00, confirming the optimal fit of the model (Browne & Cudeck, 1993). The comparative fit index (CFI) was 0.995, which was above the recommended 0.95 standard for excellent (Hu & Bentler, 1999). The Tucker Lewis Index (TLI) was 0.993, which was also above the recommended 0.95 standard for excellent (Hu & Bentler, 1999). The Chi-Square was significant ($\chi^2 = 784.732, df = 83, p < .001$) but, as stated previously, the Chi-Square was not considered to be an appropriate index of model fit in this study.
**Table 4.9.** Factor loadings for a CFA testing a model of HCAHPS items and original HCAHPS factor structure*

<table>
<thead>
<tr>
<th>HCAHPS Items</th>
<th>CMS Model</th>
<th>Peplau’s Model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nurse factor loading</td>
<td>Staff factor loading</td>
</tr>
<tr>
<td>Q01</td>
<td>0.920</td>
<td>-</td>
</tr>
<tr>
<td>Q02</td>
<td>0.933</td>
<td>-</td>
</tr>
<tr>
<td>Q03</td>
<td>0.869</td>
<td>-</td>
</tr>
<tr>
<td>Q04</td>
<td>-</td>
<td>0.812</td>
</tr>
<tr>
<td>Q11</td>
<td>-</td>
<td>0.667</td>
</tr>
<tr>
<td>Q08</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Q09</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Q13</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Q14</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Q16</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Q17</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Q19</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Q20</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Q23</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Q24</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Q25</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

* all factor loading significant at $p < .0001$

**Hypothesis 1c:** The fit of the Peplau-guided model will be comparable to the fit of the eight-factor model supporting the viability of the Peplau model for further study.

Hypothesis 1c was not supported; that is, the Peplau model was not comparable to the CMS model. The Bayesian Information Criteria (BIC) approximation was used to compare models. According to Raftery (1995), the BIC approximation is a more appropriate test for comparing models than tests using $P$-values, especially in studies with large sample sizes. For the Peplau model, the BIC approximation was 276595.588, and for the CMS model it was 270481.626. Since a smaller BIC approximation denotes the better model (Neath & Cavanaugh, 2012), the Peplau model was found to be not comparable to the CMS model. A second formal test was
conducted to compare the models and confirm the finding of the BIC approximation. Log likelihood and scaling correction factor were used to compute the two models’ Chi-square differences (Kass & Raftery, 1995; Satorra, 2000). The results confirmed that the fit of the Peplau’s model not comparable to the CMS model ($\chi^2 = 129.74, df = 20, p < .0001$). Because hypothesis 1C was not supported, hypotheses 2a and 2b were not attempted. The factor loadings of the Peplau model are included on Table 4.9 for comparison.

**Ancillary Analyses**

The ancillary analyses section includes findings that are not directly related to hypothesis testing. This section contains a testing of a three-factor model of Peplau’s (1952/1991) theory of interpersonal relations in nursing, as well as a test of whether the three-factor model made significant contributions to the prediction of patients’ responses to the overall hospital rating (OHR) items, beyond that made by unrelated items.

**Reasons to test the three-factor model.** Testing of a three-factor model was indicated by output noted during review of the two-factor CFA, Peplau’s original descriptions of the theory, and previous patient experience research. In the current study, modification indices (MIs) were inspected to identify adjustments to the two-factor model that would improve the fit. In particular, correlations between items’ residual variances were considered. The correlations with the largest drops in Chi squares were included in adjustments to the model. A correlation between the residual variances (MI = 750.264) was found in the output from the two-factor model between the answers to HCAHPS question 1 “During this hospital stay, how often did nurses treat you with courtesy and respect?” and Question 2: “During this hospital stay, how often did nurses listen carefully to you?” It was decided that this correlation was consistent with the “orientation” phase in Peplau’s (1952/1991) original three-phase theory. From these CFA
data, it was considered that the original study hypotheses may have been incorrect, and that the orientation phase may not be subsumed by the other two phases in these data.

The orientation phase was described by Peplau (1997) as a time for introductions and careful listening on the part of nurses. “The orientation of nurse to patient is mostly a one-way contact: the nurse first identifies herself by name and professional status and states the purpose, nature, and time available for the patient…the main focus of the nurse’s attention is on the patient, listening, hearing what is said, and asking who-, what-, where-, when-type questions to stimulate the patient’s descriptions and stories” (p. 164). Peplau (1992) emphasized that careful, nondirective listening was extremely important, and wrote: “it is during this time period, in the orientation phase, that the nurse’s behavior signals a pattern of receptivity and interest in the patient’s concerns or fails in this regard” (p. 164).

Qualitative research by Forchuk et al. (1998) about patients’ adjustment from the orientation to the working phase found that patients who made successful transitions had experienced respect and careful listening from nurses during the orientation phase. Nurses who facilitated a smooth orientation phase for patients were described by patients as genuine, understanding, and respectful; capable of “treating [patients] as human beings” (Forchuk et al., 1998, p. 40). Whereas nurses who hindered patients during the orientation phase were said to be distant, superficial, and arrogant: “They don’t acknowledge me. It’s like being in limbo” (Forchuk et al., 1998, p. 41). With regard to careful listening, one patient in the study stated: “Sometimes it’s repetitive and staff tune out. But [my nurse] continues to listen. That’s the difference” (Forchuk et al., 1998, p. 39). Another patient stated: “She [my nurse] listens to me, what I say. When I talk, she doesn’t make a sound” (Forchuk et al., 1998, p. 39-40). This description of the orientation phase was thought to be very similar to HCAHPS Question 1:
“During this hospital stay, how often did nurses treat you with courtesy and respect?” and Question 2: “During this hospital stay, how often did nurses listen carefully to you?”

In more recent quantitative research, Otani, Herrman, and Kurz (2011) found that nursing care was the most highly influential factor when tested against staff care, physician care and environment. More importantly, using a two-stage multiple linear regression, Otani et al. (2011) found that within the nursing care factor, the first and second most influential empirical variables were answers to HCAHPS Question 1: “During this hospital stay, how often did nurses treat you with courtesy and respect?” and Question 2: “During this hospital stay, how often did nurses listen carefully to you?” These two items appear to be more important and more empirically linked than was initially thought in the current study hypotheses.

**Testing the Three-factor Model.** A testing of a three-factor model was performed using CFA in the same fashion and with the same data as the previous models (see Main Analysis, Hypotheses 1a and 1b), and it resulted in an improved Peplau-based model. In addition to “working” and “termination,” Peplau’s first phase of the nurse-patient relationship, orientation, was added into the CFA. This factor consisted of Question 1: “During this hospital stay, how often did nurses treat you with courtesy and respect?” and Question 2: “During this hospital stay, how often did nurses listen carefully to you?” The three-factor model resulted in a good fit (RMSEA = 0.068 [CI 0.066, 0.069; probability of RMSEA ≤ .05 = 1.00], CFI/TLI 0.958/0.950, χ² = 5879.320, df = 101, p < .0001). The reliability of the three factor model was acceptable for the orientation and working phases’ Cronbach’s alphas (0.82 & 0.81, respectively), questionable for the termination phase’s Cronbach’s alpha (0.65), and acceptable for all three phases with regard to ordinal alphas (orientation = 93, working = 0.89, termination = 0.72).
In addition, modification indices (MIs) were inspected to identify adjustments to the three-factor model that would improve the fit. Inspection of the MIs revealed relevant correlations between six items’ residual variances: (a) H13 and H14 (MI = 3156.404), which were both about pain management; (b) items H16 and H17 (MI = 716.663), which were both about medication teaching; and (c) H2 and H3 (MI = 515.364), which were about nurses listening carefully and explaining. These were the largest correlations between residuals compared to the remaining correlations (all lower than 339.712). The inclusion of these correlations in the three-factor CFA significantly improved the fit of the model (RMSEA = 0.039 [CI 0.038, 0.041; probability of RMSEA ≤ .05 = 1.00], CFI/TLI 0.986/0.983, \( \chi^2 = 1975.173, \) \( df = 98, p < .0001 \)). As noted previously, a RMSEA score of 0.01 is considered excellent, 0.05 good, and 0.08 mediocre (Browne & Cudeck, 1993; Kenny, 2014). The RMSEA score of 0.039 for the three-factor model is within the excellent to good score range of 0.01 to 0.05.

The new three-factor CFA model is presented in Figure 4.2, in which ovals represent the three latent variables (orientation, working, and termination) and squares represent observed variables, which are the individual HCAHPS survey questions. Factor loadings are listed on the arrows that go from the latent variables to the observed variables. Correlations between the latent variables are expressed as Pearson’s r coefficients, and are listed on the arrows to the left of the figure that intersects between the latent variables. The two factors of working and orientation are very highly correlated (0.921, \( p < .001 \)). The factors of working and termination are correlated (0.737, \( p < .001 \)), as are the factors of termination and orientation (0.618, \( p < .001 \)). Correlations between residuals (for h2 & h3, h13 & h14, and h16 & h17) are listed to the right of the observed variables, on small arrows.
Figure 4.2. CFA Peplau model with three factors
The three-factor Peplau model, however, was not a better fit to the data than the CMS factor structure. For the three-factor Peplau model the BIC approximation was 271660.414; for the CMS model it was 270481.626. The three-factor Peplau model showed a better fit when compared to the two-factor Peplau model (BICs = 271660.414 versus 276595.588, respectively). Because of the superior performance of the three-factor model as compared to the two-factor model, the decision was made to proceed with the generalized linear models described in chapter III; these were not attempted in the main analyses due to the study limitations.

**Three-factor model and patients’ overall hospital ratings**

A set of generalized linear models created using SPSS, version 22 (IBM Corp., 2013), showed that the orientation, working, and termination phases made significant contributions to the prediction of patients’ responses to the overall hospital rating (OHR) item (H21), beyond that made by unrelated items. The HCAHPS “physician communication” items (nos. 5-7) and the “about you” items (nos. 26-32) were included in a single model, labeled Model 1. The Peplau factor of “orientation” was combined with Model 1 and this new model was labeled Model 2. Following this, the Peplau factor of “working” was combined with Model 2 and this new model was labeled Model 3. Following this, the Peplau factor of “termination” was combined with Model 3, and this new model was labeled Model 4. These models were created to test the contribution of each Peplau factor in predicting OHR.

Each factor had a significant association with the outcome, OHR (see Table 4.10). The magnitude of the standardized Beta value for “physician communication” was .515 in Model 1. The standard errors (SE) for the Beta values measure the accuracy of estimation of the Beta values. They are relative to the estimation, and since they are reasonably low compared to the Beta value estimates, they support accuracy of the Beta values in the model. Once the Peplau
factors were added, the magnitude of the Beta value for “physician communication” was reduced to .154, meaning that Peplau’s factors explained a larger portion of the variability of the scores for OHR than the “physician communication” factor. However, the contribution of the “termination” factor was limited (.152) when compared to the “orientation” and “working” factors (.297 & .302) in the final Model (4). The contribution of the termination factor to OHR was similar to that made by the “physician communication” latent factor (.154).

In other words, in Model 1, for every 1 point increase in “physician communication” scores, OHR scores could be expected to rise by .515 points. Holding “physician communication” constant in Model 2, for every 1 point increase in “orientation” scores, OHR scores could be expected to rise by .496 points. Holding “orientation” constant in Model 2, for every 1 point increase in “physician communication” scores, OHR scores could be expected to rise by .296 points. Holding “physician communication” and “orientation” scores constant in Model 3, for every 1 point increase in “working” scores, OHR scores could be expected to rise by .356 points. Holding “physician communication” and “working” scores constant in Model 3, for every 1 point increase in “orientation” scores, OHR scores could be expected to rise .305 points. Holding “working” and “orientation” scores constant in Model 3, for every 1 point increase in “physician communication” scores, OHR could be expected to rise by .184 points. Holding “physician communication,” “orientation” and “working” constant in Model 4, for every 1 point increase in “termination” scores, OHR scores could be expected to rise by .152 points. Holding “physician communication,” “orientation,” and “termination” constant in Model 4, for every 1 point increase in “working” scores, OHR scores could be expected to rise by .302 points. Holding “physician communication,” “working,” and “termination” constant in Model 4, for every 1 point increase in “orientation” scores, OHR scores could be expected to rise by .297
points. Lastly, holding “orientation,” “working,” and “termination” constant in Model 4, for every 1 point increase in “physician communication,” scores, OHR scores could be expected to rise by .154 points.

Table 4.10. Generalized linear model of CFA using HCAHPS item 21*

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Beta**</th>
<th>SE</th>
<th>Wald Chi-Square</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physician communication</td>
<td>.515</td>
<td>.014</td>
<td>1456.045</td>
<td>1</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Model 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physician communication</td>
<td>.269</td>
<td>.013</td>
<td>434.909</td>
<td>1</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Orientation</td>
<td>.496</td>
<td>.014</td>
<td>1304.963</td>
<td>1</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Model 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physician communication</td>
<td>.184</td>
<td>.013</td>
<td>196.847</td>
<td>1</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Orientation</td>
<td>.305</td>
<td>.014</td>
<td>501.925</td>
<td>1</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Working</td>
<td>.356</td>
<td>.012</td>
<td>821.503</td>
<td>1</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Model 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physician communication</td>
<td>.154</td>
<td>.013</td>
<td>140.457</td>
<td>1</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Orientation</td>
<td>.297</td>
<td>.013</td>
<td>494.154</td>
<td>1</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Working</td>
<td>.302</td>
<td>.012</td>
<td>590.218</td>
<td>1</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Termination</td>
<td>.152</td>
<td>.010</td>
<td>253.293</td>
<td>1</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>

*The analysis was performed controlling for “about you” variables.

**Standardized regression coefficients

Three-factor Model and Patients’ Likelihood to Recommend

A set of generalized linear models created using SPSS, version 22 (IBM Corp., 2013), showed that the orientation, working, and termination phases made significant contributions to the prediction of patients’ likelihood to recommend (LTR) the hospital to family and friends (item H22), beyond that made by unrelated items. As was done to test patients’ overall hospital ratings, the HCAHPS “physician communication” items (nos. 5-7) and the “about you” items (nos. 26-32) were included in a single model, labeled Model 1. The Peplau factor of “orientation” was combined with Model 1 and this new model was labeled Model 2. Following this, the Peplau factor of “working” was combined with Model 2 and this new model was labeled Model 3. Following this, the Peplau factor of “termination” was combined with Model 3, and
this new model was labeled Model 4. This was done to test the contribution of each Peplau factor in predicting scores on the LTR item. The analyses were performed controlling for the “about you” variables.

Each factor had a significant association with the outcome LTR (see Table 4.11). The magnitude of the Beta value for “physician communication” was .477 in Model 1. Once the Peplau factors were added, the magnitude of the Beta value for “physician communication” was significantly reduced to .167, meaning that Peplau’s factors explained a larger portion of the variability of the scores for H22 than the “physician communication” factor. Additionally, it was noted that the “orientation” factor made the greatest contribution (.272), the “working” factors made the second largest contribution (.221) and the “termination” factor made the third-largest contribution (.159), similar to that made by the “physician communication” latent factor (.167). Once again, the standard errors (SE) for the Beta values supported accuracy of the Beta values in the model.

In other words, in Model 1, for every 1 point increase in “physician communication” scores, LTR scores could be expected to rise by .429 points. Holding “physician communication” constant in Model 2, for every 1 point increase in “orientation” scores, LTR scores could be expected to rise by .429 points. Holding “orientation” constant in Model 2, for every 1 point increase in “physician communication” scores, LTR scores could be expected to rise by .264 points. Holding “physician communication” and “orientation” scores constant in Model 3, for every 1 point increase in “working” scores, LTR scores could be expected to rise by .277 points. Holding “physician communication” and “working” scores constant in Model 3, for every 1 point increase in “orientation” scores, LTR scores could be expected to rise .280 points. Holding “working” and “orientation” scores constant in Model 3, for every 1 point increase in
“physician communication” scores, LTR could be expected to rise by .198 points. Holding “physician communication,” “orientation” and “working” constant in Model 4, for every 1 point increase in “termination” scores, LTR scores could be expected to rise by .159 points. Holding “physician communication,” “orientation,” and “termination” constant in Model 4, for every 1 point increase in “working” scores, LTR scores could be expected to rise by .299 points.

Holding “physician communication,” “working,” and “termination” constant in Model 4, for every 1 point increase in “orientation” scores, LTR scores could be expected to rise by .272 points. Lastly, holding “orientation,” “working,” and “termination” constant in Model 4, for every 1 point increase in “physician communication” scores, LTR scores could be expected to rise by .167 points.

**Table 4.11.** Generalized linear model of CFA using HCAHPS item 22*

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Beta**</th>
<th>SE</th>
<th>Wald Chi-Square</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physician communication</td>
<td>.477</td>
<td>.014</td>
<td>1140.793</td>
<td>1</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td><strong>Model 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physician communication</td>
<td>.264</td>
<td>.015</td>
<td>332.135</td>
<td>1</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Orientation</td>
<td>.429</td>
<td>.015</td>
<td>827.064</td>
<td>1</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td><strong>Model 3</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Physician communication</td>
<td>.198</td>
<td>.015</td>
<td>181.693</td>
<td>1</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Orientation</td>
<td>.280</td>
<td>.016</td>
<td>318.685</td>
<td>1</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Working</td>
<td>.277</td>
<td>.014</td>
<td>388.244</td>
<td>1</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td><strong>Model 4</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physician communication</td>
<td>.167</td>
<td>.015</td>
<td>131.998</td>
<td>1</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Orientation</td>
<td>.272</td>
<td>.015</td>
<td>312.014</td>
<td>1</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Working</td>
<td>.221</td>
<td>.014</td>
<td>244.562</td>
<td>1</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Termination</td>
<td>.159</td>
<td>.011</td>
<td>222.636</td>
<td>1</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>

*The analysis was performed controlling for “about you” variables.

**Standardized regression coefficients
Chapter V

Discussion

The results of the study were as follows: (a) Peplau’s (1952/1991) middle-range theory of interpersonal relations in nursing was supported using patient experience data, and (b) nursing activities, grouped according to Peplau’s (1952/1991) theory, were significantly associated with and could predict patients’ experiences in hospitals. Previous research supported the finding that patients most strongly equated the overall quality of their care with the quality of nursing services they received (e.g. Press Ganey, 2013; Wolosin, Ayala, & Fulton, 2012). The present study found that 16 items on the Consumer Assessment of Healthcare Providers and Systems - Hospital (HCAHPS) survey (See Appendix A) factored into two indicators of Peplau’s (1952/1991) theory. Ancillary analyses showed: (a) a more theoretically accurate three-factor model of Peplau’s (1952/1991) theory had a better fit to the data than the two-factor model, and (b) two sets of generalized linear models based on the three-factor model showed that it made significant contributions to the prediction of patients’ responses to the overall hospital rating item and patients’ likelihood to recommend the hospital to family and friends. This chapter explains findings related to: (a) sample characteristics, (b) psychometric properties of the HCAHPS survey, (c) the research hypotheses, (d) ancillary analyses, and (e) the theoretical framework.

The Sample Characteristics

There is research to support findings that characteristics such as sex may affect patients’ experiences (Elliot et al., 2012); however, Peplau’s (1952/1991) theory does not describe specific patient characteristics that may influence the nurse-patient relationship, and they are not included in the main analysis. The sample in this study had some similar characteristics to
samples in previous studies of HCAHPS data, but there were also differences. As in previous HCAHPS studies, patients in the current study were predominately female and had a mean length of stay of approximately four days. However, patients in the current study were older, more racially diverse (though still majority Non-Hispanic White), more likely to speak Spanish, more highly educated, and more likely to have perceived themselves to have been in good physical and mental health than those in previous studies. These findings were detailed in chapter 4, in which the study sample was compared and contrasted to samples in previous HCAHPS studies, as well as to information about residents of the borough of Manhattan and the entire US.

**Psychometric Evaluation of the HCAHPS Survey**

The Cronbach’s and ordinal alpha of this study showed that reliability of the HCAHPS survey responses in the current study was questionable; however, the CFA’s imply that the HCAHPS survey is sufficiently reliable for continued use. In the current survey, only five of the nine coefficients were greater than 0.7, which is the acceptable level according to Nunnally and Bernstein, (1994). Ordinal alpha, another estimate of the reliability of psychometric test scores, (see Chapter 4), showed that only six of the nine coefficients were greater than 0.7, which is the acceptable level according to Gadermann, Guhn, and Zumbo (2012). This is in keeping with the findings of Westbrook, Babakus, and Grant, (2014) who recently called into question the validity of the HCAHPS survey.

“Weak” reliabilities were demonstrated in 1,030 survey results from two Tennessee hospitals (Westbrook et al., 2014, p. 108). Weak reliabilities (all less than 0.7) were noted in the following factors: (a) communication about medicine, (b) discharge information, and (c) staff responsiveness. The researchers observed that these three factors had weak reliabilities in the
HCAHPS pilot study as well (Westbrook et al., 2014). These same three factors had questionable Cronbach’s alpha coefficients in the Rothman et al. (2008) and in the current study.

As in the current study, Westbrook et al. (2014) also used CFA. However, their intentions were to reproduce the original CMS factor structure and further investigate reliability. They obtained results that fit the model more poorly than results of the current study’s estimate of the CMS factor structure. Despite being only in the good to mediocre range, the model indices were considered acceptable by Westbrook et al. (2014).

However, for Westbrook et al. (2014) the low Cronbach’s alpha coefficients brought into question the reliability of the HCAHPS survey. This has ramifications because financial decisions are made based on the outcome of the HCAHPS (Westbrook et al. (2014). Westbrook et al. (2014) concluded that though the HCAHPS represents a solid beginning to a measurement of patient experiences that is equitable to all stakeholders, “our findings raise concerns about the current version of HCAHPS measures, and therefore we refrain from declaring these measures as the golden standard for measuring patient perceived hospital service quality especially when there are financial considerations” (Westbrook et al., 2014, p. 111).

Ultimately, the questionable Cronbach’s alpha coefficients in the current and past studies are cause for concern, but they need to be accepted as parts of a larger whole in order to pursue the study of patients’ experiences. The CFA’s offer a better estimate of reliability. Westbrook, et al. (2014) quoted Nunnally and Bernstein (1994), who wrote: “If important decisions are made with respect to test scores, a reliability of .90 is the bare minimum” (p. 108). While important, it is difficult to equate HCAHPS survey scores with other possibly more vital surveys to which Nunnally and Bernstein (1994) may be referring. For example, how well a survey for depression can detect suicidal tendencies is arguably more important than whether hospitalized patients
perceived that nurses explained things well. Moreover, as a paper by Eisinga, te Grotenhuis, and Pelzer (2012) posits, Cronbach’s alphas based on two-item scales (such as communication about medicine, discharge information, and staff responsiveness) may well be “meaningless” (p. 637).

With regard to the psychometric evaluation of the HCAHPS survey, the current study offered statistical support for a new measure on the HCAHPS survey, known as the Care Transition Measure (CTM)(see Figures 1.2 & 1.3, Table 4.7), which was developed by Coleman, Mahoney, and Parry (2005), piloted by Rothman et al. (2008), and mandated for use as of January, 2013 (Lehrman & Goldstein, 2012). There have been no published studies of HCAHPS data that included this measure since it was put in place. The CTM is made up of HCAHPS item 23 to 25 (see Appendix A). In the current study, the CTM had acceptable Cronbach’s and ordinal alphas ($\alpha = 0.79$, ordinal = 0.88), but was not evaluated in Westbrook, Babakus, and Grant’s 2014 study, which used HCAHPS data from before 2013. In this study, the CTM factored as hypothesized onto the Peplau (1952/1991) termination phase. The scope of these questions aligned with Peplau’s (1952/1991) broad framework of nurses’ professional contributions to patients’ experiences.

**Model Goodness of Fit**

The goodness of fit of the CFA in this study was acceptable, and the Peplau-based, two-factor model performed sufficiently well, indicating support for the model and for the idea that nurses’ professional contributions to patients’ experiences are broader than may be currently portrayed in the HCAHPS survey. The model fit indices for the current study were comparable to a very recent study by Zhu et al. (2015), which reported on CFA’s of HCAHPS data from a cohort of 5,796 patients. The patients in the Zhu et al. (2015) study were grouped in terms of seven racial/ethnic groups (see Table 4.3); each group had 828 patients of a different race or
ethnicity. Unlike the current study, the CFA’s in Zhu et al. (2015) used only the observed variables for the CMS-derived latent factors of “communication with nurses,” “communication with doctors,” and “communication about medicines.” Confirmatory factor analyses were performed on survey data from the entire cohort and then from each racial/ethnic group. Model fit indices indicated a good fit to the data.

**Research Hypotheses**

The results of the two-factor and three-factor CFAs supported the hypothesis that analysis of HCAHPS data is a valid way to test Peplau’s (1952/1991) theory and indicated that nursing care based on Peplau’s (1952/1991) theory may provide better experiences for patients. There is support in the literature for a broader definition of nurses’ professional practice that is regularly evaluated in terms of patients’ experiences. The following is an overview of research studies that addressed patients’ experiences, which Peplau (1987) asserted are the most important subject of nursing research. These studies are discussed with regard to the current study.

Larrabee and Bolden (2001) identified five themes about the elements that adult, mentally competent patients (N = 199) considered to be important with regard to nursing: (a) providing for my [patient] needs, (b) treating me pleasantly, (c) caring about me, (d) being competent, and (e) providing prompt care. These themes are similar to many of the HCAHPS items in which nursing is not mentioned but which are encompassed in the Peplau (1952/1991) model.

As in the current research, Davis (2005) found in interviews with hospitalized patients that they had positive experiences with nurses who were: “calm, courteous, kind, attentive, comforting, sincere, available, empathetic, and reassuring” (Davis, 2005, p 129). Patients also had positive experiences with nurses who were prompt, technically skilled, and medically
knowledgeable (Davis, 2005). Davis (2005) and other researchers observed that patients’ experiences of good nursing care affected overall satisfaction with hospitalization, and that bad nursing care tainted the entire hospital experience (Becker et al., 2014; Otani et al., 2011; Press Ganey, 2013; Wolosin et al., 2012).

The current study supports the idea that nurses’ contributions to patients’ experiences are not currently being adequately measured by the HCAHPS survey as it is currently interpreted by researchers (e.g. Wennberg et al., 2009; Stein et al., 2014). The finding that nurses have extensive responsibilities was supported by a study of patients’ satisfaction with care and nurse staffing levels, which drew on responses from 827,430 patients from 733 hospitals in 25 states (Clark et al., 2007). In this study, the ratio of working RNs per state population was compared to answers to six questions in the “satisfaction with nursing” sections of a standardized satisfaction survey. The six questions measured the following: (a) friendliness/courtesy of nurses, (b) nurses’ promptness in responding to call buttons, (c) nurses’ attitude toward requests, (d) amount of attention paid by nurses to special or personal requests, (e) the degree to which nurses kept [patients] informed, and (f) the skill of nurses. The researchers also reported that states’ supplies of working RNs per patient were significantly and positively associated with patients’ overall satisfaction with care as measured by the satisfaction survey (Pearson $r = 0.44; p < .05$)(Clark et al., 2007). Other HCAHPS items that also showed a significant, positive correlation with state supply of RNs are not typically thought of or measured as nursing functions. However, they are included in the Peplau-based two-factor model. Examples of these items included: “personal issues (e.g., emotional/spiritual needs, pain, and involvement in decision making), discharge processes, and explanation of tests and treatment” (Clark et al., 2007, p. 122).
Although it was not the intent of the researchers to do so, studies of patients’ experiences of “missed nursing care” focused on a reverse of the premise of the current study (Kalisch et al., 2012, 2014) and offered further support for the research hypotheses in this study. Nursing care that was least satisfying to patients included: (a) failure to respond to call lights, (b) not listening to patients’ questions and concerns, (c) leaving requests unfulfilled, and (d) unperformed discharge planning (Kalisch et al., 2012, 2014). The “missed nursing care” studies inadvertently addressed many of the HCAHPS items in the two-factor Peplau-based model. A breadth of services similar to the items in the current study was reported by patients as actions nurses should have taken (Kalisch et al., 2012, 2014).

**Ancillary Data Findings**

Testing of a more theoretically accurate three-factor model of Peplau’s (1952/1991) theory showed that the three-factor model was a better fit to the data than the two-factor model. The decision to investigate the possible support for the three-factor model was based on Peplau’s (1952/1991) and other studies of the theory of interpersonal relations in nursing, as well as the strong correlations between the residual variances of HCAHPS question 1 and 2 in the two-factor model (see chapter 4 & Appendix A). Although other correlations existed between other items in the current study, Byrne (2012) and Samuels (2015) caution against making assumptions that are not based in theory. Byrne (2012) writes: “Fit indices yield information bearing only on the model’s lack of fit. More importantly, they can in no way reflect the extent to which the model is plausible; this judgment rests squarely on the shoulders of the researcher” (p. 77). The following section discusses literature that supports the more theoretically accurate three-factor model.
In a quantitative, descriptive study De Vinci (2010) found that a program of sensitivity training designed to improve staff behaviors of courtesy and effective communication significantly improved patients’ \((N = 148)\) overall satisfaction, \(t (6) = -5.63, p < .001\), on a standardized scale used in a northeastern US hospital. This finding lends support to the establishment of Peplau’s (1952/1991) “orientation phase” as its own latent factor in a three factor model. Peplau (1952/1991) emphasized that during the orientation phase, when nurses and patients are strangers to each other, nurse courtesy and respect is of paramount importance. Respect and courtesy (HCAHPS q. 1) are important qualities that demonstrate nurses’ acceptance of patients and willingness to treat them as “emotionally able” (Peplau, 1952/1991, p. 44). Careful listening (HCAHPS q. 12) demonstrates to patients that nurses consider them to be “active participants” in their own care (Peplau, 1952/1991, p. 49).

Otani et al. (2011) found that within the HCAHPS nursing care factor, the first and second most influential empirical variables were answers to HCAHPS question 1 and question 2. Similar conclusions about the nurse communication factor are well-supported (Jha et al., 2008; Elliott et al., 2009; Wolosin et al., 2012; Becker et al., 2014). The better goodness of fit of the three-factor model when compared to the two-factor model implies that delineation of a separate “orientation” factor is warranted.

**Generalized linear models.** In further support for the three-factor model, the generalized linear models constructed in ancillary analysis showed that the orientation, working, and termination phases made significant contributions to the prediction of patients’ responses to the overall hospital rating item (H21) and the patients’ likelihood to recommend item (H22), beyond that made by unrelated items. This is especially important because it provides evidence
that nurses could employ Peplau’s (1952/1991) theory as a guide for nursing practice, and that
nursing care based in Peplau’s (1952/1991) theory could lead to better experiences for patients.

The contributions made by the phases differed in each generalized linear model, implying
that patients valued different aspects of nursing care when two-factor and three-factor models
were used. With regard to the hospital rating on a scale of 0 to 10, the contributions of the
“orientation” and “working” phases were about equal, and each one’s contribution was greater
than the “termination” phase’s contribution (see Table 4.10). In order to give one number to
describe their overall experiences, patients relied equally on their impressions of: (a) courtesy
and careful listening by the nurse, and (b) the work of nurses as medication educators, resource
persons for pain management, and direct care-providers.

In contrast, the “orientation” phase made the greatest contribution towards the likelihood
of patients’ recommending the hospital to family and friends, followed by the contribution of the
“working” phase and lastly the contribution of the “termination” phase (see Table 4.11). When
deciding if the hospital was worth recommending to family and friends, patients mostly recalled
their initial experiences with nurses’ courtesy and careful listening. Peplau (1997) noted: “the
feeling of disconnectedness is greatest when patients are first admitted to the hospital, and
anxiety is also likely to be felt” (p.166). It may be that patients recall their experiences of
interacting with nurses when they are first admitted to the hospital, and decide if their family and
friends would have decreased anxiety and feelings of disconnectedness because of nurses’
actions.

The “termination” phase should not be devalued, however, because nurses’ support of
patients throughout all three phases is necessary for patients to arrive at a state of “integration”
(Peplau, 1952/1991) of their experiences. In a study of 113 postsurgical patients, those who
reported experiencing higher levels of “patient-empowering nurse behaviors” had greater levels of “post-discharge activation” (Jerofke, Weiss, & Yakusheva, 2014, p. 1311), which is directly in keeping with the termination phase of the Peplau-based two-factor model. Patients were enrolled in a non-experimental, prospective, correlational study that measured their perceptions of patient-empowering nurse behaviors. These behaviors were consistent with HCAHPS items included in the CFA, for example: “(a) helping patients to realize they can participate in their care and treatment planning; (b) providing patients with access to information, support, resources, and opportunities to learn and grow; and (c) helping to facilitate collaboration with providers, family, and friends” (Jerofke et al., 2014, p. 1311). Results of this research indicated that patient empowering nurse behaviors were significantly associated with post discharge patient activation levels, which aligned with the Peplau (1952/1991) concept of integration.

The findings of the generalized linear models further validated the creation of a three-factor model in the ancillary analyses, in addition to the model’s better congruence with Peplau’s (1952/1991) original theory. The following section continues with a discussion of Peplau’s (1952/1991) theory and literature that supports the three-factor model and its continued use in practice.

**Theoretical Framework**

The theoretical framework of this study - Peplau’s (1952/1991) theory of interpersonal relations in nursing - was supported in ancillary analyses. Peplau was the first theorist “to articulate the idea that the work of the nurse is inextricable from the patient’s experience of receiving care” (McCamant, 2006, p. 336); this same idea has been supported by the CFA’s performed in the current research. Prior research indicated that nurses’ use of Peplau’s (1952/1991) theory improves patients’ experiences. For example, Forchuk and Brown (1989)
designed an instrument, the Relationship Form, to measure the phases of nurse-patient relationships in psychiatric settings; results of the instrument testing supported that patients’ experiences were better when they successfully moved through the three phases described by Peplau (1952/1991). The researchers reported poor interrater reliability (K = .41), but anecdotally noted that when nurses used the instrument they were able to provide appropriate interventions based on which of the three phases patients were experiencing. Qualitative research by Forchuk et al. (1998) about the transition of patients from the Peplau (1952/1991) orientation phase to the working phase found that patients who successfully made the transitions had experienced respect and careful listening from nurses during the orientation phase. Forchuk et al. (2000) also found that when nurse-patient dyads were observed to progress through the three phases (Peplau, 1952/1991), patients made progress toward their goals. However, if the orientation phase stalled or failed, patients were unlikely to progress further (Forchuk et al., 2000).

In an observational study of prenatal home visits, McNaughton (2005) noted findings that are reinforced by the current study: “Peplau’s theory could be used as a framework for the delivery of nursing services” (p.436). McNaughton (2005) supported the idea that, in home health nursing services provided to pregnant, English-speaking patients with risk factors for complicated pregnancies, Forchuk and Brown’s (1989) instrument could be utilized to monitor and document relationship development. McNaughton (2005) noted that, “progression through the working and resolution [i.e., termination] phases would indicate the appropriate time to end home visits. Outcomes of home visits such as client’s use of resources or change in health behaviors could be documented to demonstrate the effectiveness of home visits” (p. 436).
In a randomized clinical trial of a Peplau-based intervention to decrease anxiety in preoperative and postoperative patients in a Turkish hospital, researchers found a decrease in anxiety levels of the interventional group ($n = 60, p < .05$)(Erci, Sezgin, & Kaçmaz, 2008). In this study, demographic and preoperative anxiety levels were controlled, and the interventional group received care from nurses who had been trained in identifying Peplau’s (1952/1991) stages and tailoring interventions to which stages patients were exhibiting (Erci, Sezgin, & Kaçmaz, 2008). This was one of the only Peplau-based interventional studies that was performed with a sample of hospitalized patients, and the results reinforce the findings of the current research.
Chapter VI

Conclusions, Implications, and Recommendations

This chapter provides conclusions from the study results and implications for nursing service, education, and research. Recommendations based on the study results are also provided, and the limitations of the study are explained.

Conclusions

This study demonstrated that the contributions of nurses’ to patients’ experiences are more complex than may be adequately measured by the HCAHPS survey (see Appendix A) and more important than considered by many researchers. In this study, two-factor and, in ancillary analyses, three-factor confirmatory factor analyses (CFAs) based on Peplau’s (1952/1991) theory of interpersonal relations in nursing were tested and performed sufficiently well. Peplau’s (1952/1991) theoretical constructs presented an alternate conceptualization of nursing’s contribution to the current CMS-derived factor structure. Furthermore, in ancillary analyses, Peplau’s (1952/1991) phases of nursing care, i.e., orientation, working, and termination, provided a comprehensive structure for describing nurses’ professional practice as it contributes to patients’ experiences.

Secondly, the orientation, working, and termination phases of Peplau’s (1952/1991) theory made significant contributions to the prediction of patients’ responses to their overall ratings of hospital experiences. These conclusions lead to implications and recommendations about nursing practice and the environment in which quality care takes place, as well as to implications for nursing education and research.
Nursing Implications

Implications for Practice. As the survey represents a way for patients to give feedback on the quality of their experiences, and as a good part of patients’ experiences is influenced by their nurses, hospital leaders may wish to greatly increase nurses’ ownership of elements measured by the HCAHPS survey. The professional scope of nursing practice is multidimensional and broad. The current study demonstrated that the HCAHPS survey touches on many facets of nursing practice and is a valuable tool that nurses can use to measure patients’ experiences with nursing care.

This finding is further supported by the Institute of Medicine’s (2011b) report on the future of nursing. The authors of this report noted that, “Nurses have the opportunity to play a central role in transforming the health care system to create a more accessible, high-quality, and value-driven environment for patients” (p. 85). From the very beginning of the HCAHPS survey, research using HCAHPS survey data has supported the finding that nursing has the most influence on patients’ overall experiences (e.g. Jha, Orav, Zheng, & Epstein, 2008). Even when research was investigating other issues, the central role nurses played in patients’ experiences was evident because of the powerful statistical effect that nursing evoked in these data (e.g. Iannuzzi et al., 2015). By viewing the survey as a broader reflection of patients’ feedback about their nursing care, hospital leaders may ensure that patients are “co-producers” (Hibbard, 2003, p. I-64) of their care rather than simply recipients.

The current study also contributes to ongoing research about the economic impact that nursing care has on hospital reimbursement. In 2011, 32 nursing organizations wrote the following in a letter of support for value-based purchasing initiatives such as HCAHPS:

“Without nurses, any effort to improve healthcare quality in our country and implement
healthcare reform will surely fail. Therefore, as we begin to change the culture of the provision of healthcare by prioritizing, measuring, and rewarding quality care delivery, we must be sure to prioritize, measure, and reward the contribution of nurses” (Association of Perioperative Registered Nurses, 2011). Previous research has demonstrated the economic importance of high-quality nursing care to patient outcomes (Unruh, Hassmillar, & Reinhard, 2008; Stone et al., 2007). This study contributes to the next step of this research and quantifies elements of nursing care that are discrete and for which there is potential to bill, as Aiken (2008) suggests.

**Implications for Education.** The current study implies that hospital nurses would benefit from education based on Peplau’s (1952/1991) theory. Peplau’s (1952/1991) theory lends itself to nursing education, both of student nurses and nurses in clinical settings. In order to practice nursing using Peplau’s (1952/1991) theory, special preparation in Peplau’s clinical methodology and theory is required (Fawcett & DeSanto-Madeya, 2013). To facilitate patient movement through the three phases, nurses and student nurses must learn advanced self-control and techniques for monitoring their therapeutic presence (Fawcett & DeSanto-Madeya, 2013). This type of education might enable nurses to be aware of and act on opportunities to positively affect patients’ experiences. This type of education might also help nurses to recognize which of the three phases their patients are in, and tailor their activities to provide the most appropriate care.

**Implications for Research.** A replication of this study using HCAHPS data from other hospitals would benefit the understanding of this topic. Recently, a large study by Stallings-Welden and Shirey (2015) supported the finding that an established hospital nursing professional practice model based on a theoretical framework had a statistically significant positive effect on quality of care, nurse-patient interactions, nurse decision-making, nurse autonomy, nurse job
satisfaction, and patient satisfaction with care. Certainly, utilization of a Peplau-based professional practice model could contribute to improvement in patients’ experiences and increased reimbursement. There is a need to determine if this is feasible by showing evidence from a range of hospitals and patient populations.

The current study additionally provides impetus for researchers to investigate whether Peplau-based interventions improve patients’ experiences, as empirically represented by HCAHPS scores. Poor HCAHPS survey results have placed financial pressure on hospitals, and patients’ experiences have been improved as hospitals attempted to improve HCAHPS scores (Elliot et al., 2015). Studies that are based on Peplau’s (1952/1991) theory and designed to find discrete interventions to improve HCAHPS survey scores would help identify ways of improving patients’ experiences. As HCAHPS researchers Elliot et al. (2010) have noted, “Although [interventions to improve HCAHPS scores] could be construed as ‘teaching to the test,’ real improvement has occurred in domains of interest to patients. There is evidence of improvement across multiple dimensions, including more diffuse domains such as staff responsiveness and nurse communication” (p. 2066).

Recommendations

Two recommendations stemming from the study findings are: (a) hospital administrators should improve support and professional development that enables nurses to focus on the broad scope of practice reflected by a Peplau-based interpretation of the HCAHPS survey and (b) nursing leaders should implement Peplau’s (1952/1991) theory in hospital settings. To improve support for nurses, hospitals, including the study hospital, should attempt to earn “Magnet” certification (American Nurses Credentialing Center, 2014); such certification, made by an outside credentialing body, is conferred on hospitals found to have supportive work
environments for nurses. A great deal of nursing work is assessed by the HCAHPS survey; when nurses are not supported in their work, patients suffer and have poor experiences (Becker et al., 2014; Clark et al., 2007; McHugh et al., 2011, McHugh et al., 2013; Weiss et al., 2011). Researchers have found that the levels of support nurses receive in Magnet hospitals is positively related to improved HCAHPS survey results (Chen, Koren, Munroe, & Yao, 2014; Smith, 2014). Additional studies have shown that hospitals that treat employees compassionately and foster compassionate treatment of patients also achieve higher HCAHPS survey results (McClelland & Vogus 2014). The supportive environments for nurses in Magnet-certified hospitals are an example of compassionate work environments that are related to higher HCHAPS survey scores. The nurses in Magnet hospitals also benefit from being guided by a clear theoretical framework, which is mandated by Magnet certification (Fawcett & DeSanto-Madeya, 2013). Peplau’s (1952/1991) theory is one such model.

For hospitals that wish to improve their patients’ experiences, it is recommended that nursing departments implement Peplau’s (1952/1991) theory of interpersonal nursing as a theoretical framework to guide nursing practice. The theory of interpersonal relations was developed as tool to teach nurses the importance of good interpersonal relations in any practice location, including hospitals. Gastmans (1998) wrote: “Peplau undeniably deserves credit for being one of the first nursing theorists to have developed a philosophically well-founded conception of nursing that is still relevant today” (p. 1318).

Limitations

Limitations of the study were related to generalizability and the use of Listwise deletion to approach the problem of missing data. The study sample cannot be said to be representative of the overall patient population of the study hospital because response rates were low, and no
information was available about the overall patient population of the hospital in which the study took place. Therefore, though the number of subjects was large \((N = 12,436)\) the results cannot be said to be generalizable because nothing is known about the larger population of patients who were discharged and did not return the HCAHPS surveys. Just as there were significant differences in the demographic variables of those subjects whose surveys had missing data when compared to those surveys fully completed, there may have been differences between those who returned surveys and those who did not. Additionally, although the study sample demographics were also compared to other HCAHPS studies’ demographics, it was beyond the scope of this dissertation to collect comparison data on the demographics of all previously hospitalized patients in the borough of Manhattan and the borough of Manhattan and general U.S. populations. Finally, though the demographics of the sample had similarities and differences to the populations of the borough of Manhattan and general U.S. populations, it would not have been appropriate to compare the three, since the study sample was of previously hospitalized adults and not of all healthy and sick adults.

It is reasonable to suppose, however, that because of the sound statistical processes used and the large sample size, the conclusions and recommendations drawn from this study are relevant, if not completely generalizable. As Kukull and Ganguli (2012) note, “whether or not results will broadly ‘generalize,’ to other study settings, samples, or populations, is as much as matter of judgment as of statistical inference” (p. 1886).

The use of Listwise deletion to approach the issue of missing data was also a limitation. The exact nature of the missing data (missing at random versus missing not at random) could not be determined. It was only known that the data was \textit{not} missing completely at random, and therefore deleting cases may have had an effect on the results of the CFAs. Although Listwise
deletion is acceptable for use in CFA (Allison, 2003), it might have been preferable to impute the missing data and retain a larger sample size, as well as to avoid biased parameter estimates that Listwise deletion may produce (Allison, 2003). However, Allison (2002) notes that many times Listwise deletion provides results that are comparable or even better than multiple imputation.
Appendices

Appendix A: Consumer Assessment of Healthcare Providers and Systems - Hospital (HCAHPS) survey

HCAHPS Survey

SURVEY INSTRUCTIONS

◆ You should only fill out this survey if you were the patient during the hospital stay named in the cover letter. Do not fill out this survey if you were not the patient.
◆ Answer all the questions by checking the box to the left of your answer.
◆ You are sometimes told to skip over some questions in this survey. When this happens you will see an arrow with a note that tells you what question to answer next, like this:
  □ Yes
  ☐ No  ➔ If No, Go to Question 1

You may notice a number on the survey. This number is used to let us know if you returned your survey so we don’t have to send you reminders.

Please note: Questions 1-25 in this survey are part of a national initiative to measure the quality of care in hospitals. OMB #0938-0981

Please answer the questions in this survey about your stay at the hospital named on the cover letter. Do not include any other hospital stays in your answers.

YOUR CARE FROM NURSES

1. During this hospital stay, how often did nurses treat you with courtesy and respect?
   □ Never
   □ Sometimes
   □ Usually
   ☐ Always

2. During this hospital stay, how often did nurses listen carefully to you?
   □ Never
   □ Sometimes
   □ Usually
   ☐ Always

3. During this hospital stay, how often did nurses explain things in a way you could understand?
   □ Never
   □ Sometimes
   □ Usually
   ☐ Always

4. During this hospital stay, after you pressed the call button, how often did you get help as soon as you wanted it?
   □ Never
   □ Sometimes
   □ Usually
   ☐ Always
   □ I never pressed the call button
YOUR CARE FROM DOCTORS

5. During this hospital stay, how often did doctors treat you with courtesy and respect?
   1. Never
   2. Sometimes
   3. Usually
   4. Always

6. During this hospital stay, how often did doctors listen carefully to you?
   1. Never
   2. Sometimes
   3. Usually
   4. Always

7. During this hospital stay, how often did doctors explain things in a way you could understand?
   1. Never
   2. Sometimes
   3. Usually
   4. Always

YOUR EXPERIENCES IN THIS HOSPITAL

10. During this hospital stay, did you need help from nurses or other hospital staff in getting to the bathroom or in using a bedpan?
   1. Yes
   2. No → If No, Go to Question 12

11. How often did you get help in getting to the bathroom or in using a bedpan as soon as you wanted?
   1. Never
   2. Sometimes
   3. Usually
   4. Always

12. During this hospital stay, did you need medicine for pain?
   1. Yes
   2. No → If No, Go to Question 15

13. During this hospital stay, how often was your pain well controlled?
   1. Never
   2. Sometimes
   3. Usually
   4. Always

14. During this hospital stay, how often did the hospital staff do everything they could to help you with your pain?
   1. Never
   2. Sometimes
   3. Usually
   4. Always

THE HOSPITAL ENVIRONMENT

8. During this hospital stay, how often were your room and bathroom kept clean?
   1. Never
   2. Sometimes
   3. Usually
   4. Always

9. During this hospital stay, how often was the area around your room quiet at night?
   1. Never
   2. Sometimes
   3. Usually
   4. Always
15. During this hospital stay, were you given any medicine that you had not taken before?
   □ Yes
   □ No ➔ If No, Go to Question 18

16. Before giving you any new medicine, how often did hospital staff tell you what the medicine was for?
   □ Never
   □ Sometimes
   □ Usually
   □ Always

17. Before giving you any new medicine, how often did hospital staff describe possible side effects in a way you could understand?
   □ Never
   □ Sometimes
   □ Usually
   □ Always

18. After you left the hospital, did you go directly to your own home, to someone else’s home, or to another health facility?
   □ Own home
   □ Someone else’s home
   □ Another health facility ➔ If Another, Go to Question 21

19. During this hospital stay, did doctors, nurses or other hospital staff talk with you about whether you would have the help you needed when you left the hospital?
   □ Yes
   □ No

20. During this hospital stay, did you get information in writing about what symptoms or health problems to look out for after you left the hospital?
   □ Yes
   □ No

OVERALL RATING OF HOSPITAL

Please answer the following questions about your stay at the hospital named on the cover letter. Do not include any other hospital stays in your answers.

21. Using any number from 0 to 10, where 0 is the worst hospital possible and 10 is the best hospital possible, what number would you use to rate this hospital during your stay?
   □ 0 Worst hospital possible
   □ 1
   □ 2
   □ 3
   □ 4
   □ 5
   □ 6
   □ 7
   □ 8
   □ 9
   □ 10 Best hospital possible
22. Would you recommend this hospital to your friends and family?
   1. Definitely no
   2. Probably no
   3. Probably yes
   4. Definitely yes

UNDERSTANDING YOUR CARE WHEN YOU LEFT THE HOSPITAL

23. During this hospital stay, staff took my preferences and those of my family or caregiver into account in deciding what my health care needs would be when I left.
   1. Strongly disagree
   2. Disagree
   3. Agree
   4. Strongly agree

24. When I left the hospital, I had a good understanding of the things I was responsible for in managing my health.
   1. Strongly disagree
   2. Disagree
   3. Agree
   4. Strongly agree

25. When I left the hospital, I clearly understood the purpose for taking each of my medications.
   1. Strongly disagree
   2. Disagree
   3. Agree
   4. Strongly agree
   5. I was not given any medication when I left the hospital

ABOUT YOU

There are only a few remaining items left.

26. During this hospital stay, were you admitted to this hospital through the Emergency Room?
   1. Yes
   2. No

27. In general, how would you rate your overall health?
   1. Excellent
   2. Very good
   3. Good
   4. Fair
   5. Poor

28. In general, how would you rate your overall mental or emotional health?
   1. Excellent
   2. Very good
   3. Good
   4. Fair
   5. Poor

29. What is the highest grade or level of school that you have completed?
   1. 8th grade or less
   2. Some high school, but did not graduate
   3. High school graduate or GED
   4. Some college or 2-year degree
   5. 4-year college graduate
   6. More than 4-year college degree
30. Are you of Spanish, Hispanic or Latino origin or descent?
   - [ ] No, not Spanish/Hispanic/Latino
   - [ ] Yes, Puerto Rican
   - [ ] Yes, Mexican, Mexican American, Chicano
   - [ ] Yes, Cuban
   - [ ] Yes, other Spanish/Hispanic/Latino

31. What is your race? Please choose one or more.
   - [ ] White
   - [ ] Black or African American
   - [ ] Asian
   - [ ] Native Hawaiian or other Pacific Islander
   - [ ] American Indian or Alaska Native

32. What language do you mainly speak at home?
   - [ ] English
   - [ ] Spanish
   - [ ] Chinese
   - [ ] Russian
   - [ ] Vietnamese
   - [ ] Some other language (please print): ____________________

THANK YOU

Please return the completed survey in the postage-paid envelope.

[NAME OF SURVEY VENDOR OR SELF-ADMINISTERING HOSPITAL]
[RETURN ADDRESS OF SURVEY VENDOR OR SELF-ADMINISTERING HOSPITAL]

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