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Peplau's Theory of Interpersonal Relations: An Alternate Factor Structure for Patient Experience Data?

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Abstract

A confirmatory factor analysis of data from the responses of 12,436 patients to 16 items on the Consumer Assessment of Healthcare Providers and Systems–Hospital survey was used to test a latent factor structure based on Peplau's middle-range theory of interpersonal relations. A two-factor model based on Peplau's theory fit these data well, whereas a three-factor model also based on Peplau's theory fit them excellently and provided a suitable alternate factor structure for the data. Though neither the two- nor three-factor model fit as well as the original factor structure, these results support using Peplau's theory to demonstrate nursing's extensive contribution to the experiences of hospitalized patients.

Keywords

confirmatory factor analysis; HCAHPS; patient experience; Peplau

Patients' experiences in hospitals are important indicators of the quality of hospital care (Epstein, Fiscella, Lesser, & Stange, 2010). Patients' experiences are defined as their perceptions of phenomena for which they are the best or only sources of information, such as personal comfort or effectiveness of discharge planning. A primary way in which patients' experiences are measured in the United States (US) is by the Consumer Assessment of Healthcare Providers and Systems–Hospital (HCAHPS) survey. This survey was created to facilitate public reporting of patient experience data so that consumers could compare hospital scores and make informed choices and hospitals could see their strengths and weaknesses with regard to patients' experiences (Centers for Medicare and Medicaid Services [CMS], 2012).

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Only 4 of the 32 items on the HCAHPS survey explicitly are given the heading: “your care from nurses.” However, other HCAHPS items arguably reflect the work of nurses and ask about, for example, how patients' pain was managed, how responsive staff were to requests for help, environmental quietness and cleanliness, medication teaching, and discharge planning. These items refer only to “hospital staff,” even though it is likely that patients' answers largely reflect nurses' contributions to patients' care.

The conceptual framework used in developing the HCAHPS survey is derived from the Institute of Medicine (IOM). Though a latent structure following the IOM's conceptual framework should fit most sets of HCAHPS data well, it was hypothesized that a latent structure reflecting a middle-range nursing theory would provide a comparably good fit to the data, given the large role nurses play in many aspects of patients' hospital experiences. Demonstration of a comparable factor structure based on a middle-range nursing theory would more fully reflect nurses' wide contributions to patients' experiences, as measured by the HCAHPS survey.

Peplau's (1952/1991/1997) middle-range theory of interpersonal relations in nursing was chosen as a suitable nursing theory for this research because Peplau frequently acknowledged the importance of patients' experiences of nursing care. In the theory of interpersonal relations in nursing, Peplau emphasized patients' experiences and the effect that nurse-patient relationships have on those experiences. Peplau asserted that the focus of scientific research in nursing should be patients, their needs, and their perceptions about the care they received from nurses (Gastmans, 1998). The purpose of this paper is to report the results of a confirmatory factor analysis done to compare the factor structure of HCAHPS data using both the IOM (2001) conceptual model and Peplau's middle-range theory of interpersonal relations in nursing.

Conceptual Frameworks

Institute of Medicine Framework

The conceptual framework for the HCAHPS is guided by Institute of Medicine's (IOM's) domains of quality healthcare, taken from the 2001 report *Crossing the Quality Chasm*. These domains include respect for patients' values and attention to patients' preferences, expressed needs, physical comfort, and emotional support. The IOM's framework is one that emphasizes patient-centered care and places patient dignity at the forefront. The HCAHPS survey has nine underlying factors: (a) communication with nurses (operationalized by HCAHPS items 1-3), (b) communication with doctors (items 5-7), (c) responsiveness of hospital staff (items 4 and 11), (d) pain management (items 13 and 14), (e) communication about medicines (items 16 and 17), (f) discharge information (items 19 and 20), (g) physical environment (items 8 and 9), (h) transition of care (items 23-25), and (i) overall experience (items 21 and 22) (Rothman, Park, Hays, Edwards, & Dudley, 2008).

Theory of Interpersonal Relations in Nursing

In Peplau's (1952/1991/1997) 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. Peplau theorized that nurse-patient relationships must pass through three phases in order to be successful: (a) orientation, (b) working, and (c) termination.

During the brief *orientation phase*, hospitalized patients realize they need help and attempt to adjust to their current (and often new) experiences. Simultaneously, nurses meet patients and gain essential information about them as people with unique needs and priorities (Peplau, 1997). 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 and nurses must continue to display courtesy and respect throughout the three phases. Given that characteristics of the orientation phase are continued in the other two phases; in the current study, the orientation phase was not initially hypothesized to be a latent factor.

The next phase is the *working phase*, which accounts for the majority of nurses' time with patients. In this phase, nurses make assessments about patients to use during teaching and when contributing to the interdisciplinary plan of care (Peplau, 1952/1991/1997). During the working phase, the roles of nurses become more familiar to patients; they begin to accept nurses as health educators, resource persons, counselors, and care providers. Nurses practice “nondirective listening” to facilitate patients' increased awareness of their feelings regarding their changing health (Peplau, 1952/1991, p. 43). Using this therapeutic form of communication, nurses provide reflective and nonjudgmental feedback to patients for the sake of helping them clarify their thoughts. 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, and 17 (see Figure 1).

The final phase is the *termination phase*, which is more commonly thought of as discharge planning (Peplau, 1992). The success of the termination phase is dependent on how well patients and nurses navigated the orientation and working phases. A major part of the termination phase occurs when nurses teach patients about symptom management and recovery at home. In this study, the termination phase was operationalized by measuring the ratings on HCAHPS Items 19, 20, 23, 24, and 25 (see Figure 1).

Related Literature

Nurses contribute enormously to patients' experiences. The first published, nation-wide evaluation of the HCAHPS, which included data collected over 1 year (2006-2007) from 2,429 hospitals (with a 36% response rate), found that patients who rated their overall experiences as most positive were significantly more likely to have had higher numbers of nurses per patient days (Jha, Orav, Zheng, & Epstein, 2008). 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. The sample was divided into quartiles, and among the quartile reflecting the lowest ratio of nurses to patients, only 60.5% of patients reported the highest global ratings. However, among the quartile reflecting the highest ratio

of nurses to patients, 66.7% reported the highest global ratings category ($p < .001$; the exact value of χ^2 is not reported for this chi-square test).

Likewise, the HCAHPS items reflecting the communication with nurses' factor have been found to correspond strongly with patients' perceptions about their hospital experiences. Investigating the relations between putative factors on the HCAHPS survey with overall patient experience scores, Wolosin, Ayala, and Fulton (2012) found that higher nurse communication factor scores were significantly related to achieving the highest possible overall HCAHPS scores (OR = 1.05; 95% CI not provided; $p < .001$). This study used binary logistic regression and controlled for age, gender, race, education, preferred language, and self-reported health status of randomly sampled subjects ($N = 136,546$) and had an overall average response rate of 34%. More recently, a Canadian study that utilized the HCAHPS survey items with 27,492 discharged, English-speaking patients over a 3-year period found that of all the HCAHPS factors, the nurse communication factor had the strongest Pearson correlation with overall experience ratings ($r = .45$, $p < .001$) (Kemp, McCormack, Chan, Santana, & Quan, 2015). Additionally, it was found that the factors of pain management, room cleanliness, and room quietness were also significantly related to overall experience ratings ($r = .31$ to $.42$, $p < .001$). These factors largely reflect practices under the influence of nursing.

Two other recent studies have also linked the quality of nursing services with patients' hospital experiences. The first study, which utilized 2009 to 2011 nurse staffing and patient experience data from 311 California hospitals, found that higher levels of nurse staffing and less utilization of per-diem or *travel* nurses (as opposed to full time staff) are significantly, positively correlated with better patient experiences (Hockenberry & Becker, 2016). The second study compared 2010 patient experience data from almost identically matched Magnet ($n = 212$) and non-Magnet ($n = 212$) hospitals; patients in Magnet hospitals had significantly better experiences than those in non-Magnet hospitals (Stimpfel, Sloane, McHugh, & Aiken, 2016). Due to mandated nurse staffing ratios in the first study and Magnet designation in the second, two natural experiments occurred that demonstrated nursing's influence on patient experience.

Methods and Procedures

This study was a secondary data analysis of one hospital system's HCAHPS survey results using confirmatory factor analyses (CFAs). Confirmatory factor analysis is a type of structural equation modeling that measures the relation of observed variables (survey items), known as indicators, to unobserved or latent variables, known as factors. Observed variables that theoretically should have relations with latent factors will have stronger correlations than those that theoretically should not have relations (Kääriäinen, Kanste, Pölkki, Miettunen, & Kyngäs, 2011).

This study consisted of three parts. In Part 1, a CFA tested a model in which patients' responses to 16 HCAHPS survey items were the observed variables and Peplau's (1952/1991/1997) working and termination phases were the latent factors. It was hypothesized that this model would present a significant fit to the data and therefore support

Peplau's theory about nurse/patient interactions. In Part 2, another CFA tested the fit of the IOM's established factorial structure with these same 16 HCAHPS survey items. In the third part of the study, there was a comparison of the model fit indices of these two factor structures; it was hypothesized that the Peplau-based model would fit the data as well or nearly as well as the IOM-based model.

Sample

The study sample comprised 15,814 patients, 18 years of age, who had at least one overnight hospital stay and received an HCAHPS survey in 2013. These included patients discharged to home from the medical-surgical and maternity units of a large, urban, five-campus academic medical center in the mid-Atlantic region of the Eastern US.

Data Collection

The HCAHPS surveys were administered between 48 hours to 6 weeks after hospital discharge to a random sample of adult patients with a variety of health problems. The surveys were sent by mail, and no incentives were offered to subjects for completion. The surveys were not restricted to Medicare beneficiaries. Subjects were reassured in cover letters that their participation was voluntary and that participation/non-participation would not affect their health benefits. They were also reassured of their privacy and were provided with a toll-free number to call if they had any questions. The study site used a private vendor approved by CMS to collect the data. More extensive details about the survey protocols for data collection, coding, and file submission have been published elsewhere (CMS, 2012). Institutional review board exemption was granted for use of these previously collected and deidentified data. Data files were kept in a locked office on a single, password-protected laptop to which only the researcher had access.

Data Analysis

Data were analyzed for completeness and normality using the Statistical Package for Social Sciences (SPSS) software version 22, and for CFA, data were analyzed using Mplus, version 7.3. Data were analyzed in four steps. Data were first checked for multivariate normality and missing data. Then, the following CFA fit indices were computed for both the Peplau and IOM models: the root mean square error of approximation (RMSEA), comparative fit index (CFI), and Tucker Lewis index (TLI). Finally, the fit indices for both models were compared using the Bayesian Information Criteria (BIC) approximation and chi-squares.

Results

Return Rate

The rate of survey return was calculated by dividing 80% of the number of patients discharged from each campus by the number of received surveys per campus (only 80% of discharged patients are sent surveys). Discharge information was available for only 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%. Fifty-eight of the surveys were from patients who were 18 years of age, and these surveys were excluded due to study delimitations, leaving 15,756 (99.63%).

Missing Data

Excluding the three items directly related to physicians, there are 16 core items that address patient experience, two overall hospital ratings items, seven demographic items, and four items that instruct respondents to skip ahead when indicated and not to answer items about hospital care they did not receive. The majority of missing HCAHPS answers on Core Items 1-25 in the current study were created by respondents who correctly followed the instructions to skip items that were not applicable to them; during data analysis, these values were considered to be *missing by design*, consistent with CMS guidelines (CMS, 2012).

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. 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 items, and these surveys were discarded according to CMS guidelines (CMS, 2012).

Little's test was performed on the retained 3,195 (20.27%) surveys to determine if missing data were missing completely at random (MCAR). The results of the test showed that data were not MCAR ($\chi^2 = 17,289.593$, $df = 103$, $p < .001$). When missing data are not MCAR, such as in the current study, multiple imputation is an advanced and reliable technique that should be used to replace the missing data. 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, and it was attempted for this study.

Unfortunately, values for missing data failed to be generated by multiple imputation attempted using SPSS version 22, Mplus version 7.3, STATA software version 12, and SAS software version 9.4. To correct for missing data, complete case analysis, also known as listwise deletion, was used. Although listwise deletion may yield biased parameter estimates, it is acceptable for use in CFA. After listwise deletion, 78.92% ($N = 12,436$) of the original sample was retained for main analysis. This sample size met the commonly used criteria of needing >800 subjects to ensure sufficient precision to compare two models of the same data. Additionally, this sample size was consistent with recommendations for CFAs conducted using weighted least squares means and variance adjusted estimation.

Demographic Data

Characteristics of the retained sample ($N = 12,436$) are reported in Table 1. Mean age was 57.26 years ($SD = 19.03$, range = 18-102); 42.36% ($n = 5,268$) were men, and 57.64% ($n = 7,168$) were women. Mean length of stay (LOS) in the hospital was 4.31 days ($SD = 5.84$, median = 3, range = 1-142); LOS was not normally distributed. Age, sex, and LOS data were provided by the hospital and are not required by the HCAHPS survey; none were missing.

The 3,320 (21.07%) deleted surveys showed significant differences on some demographic variables compared to surveys without missing data. To determine differences, t tests were used for continuous variables (age, perceptions about physical and mental health, and educational levels), and cross-tabulation chi-squares were used 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 1 day, Black or Hispanic or of multiple race, mainly Spanish-speaking at home, less well-educated, and having lower levels of physical and mental health.

Confirmatory Factor Analyses

Peplau Model—The two-factor Peplau model performed sufficiently well. Factor loadings were standardized so that loading values could be compared. This was necessary because of the differing question formats on the HCAHPS survey, where 2, 4, or 11 answers are possible depending on the question. No outliers—that is very influential items—were found (Cook's $D_s < 1.00$; range = 0.0-0.21).

All items loaded rather well onto the factors hypothesized by the Peplau model (see Figure 2). The lowest loading was .490, and the highest was .903. All loadings were statistically significant at $p < .0001$. Indicators of model fit for the two-factor structure were acceptable. The 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 . Larger values for RMSEA indicate worse model fit; ideally, RMSEA values should not be significantly different from zero. An RMSEA score of 0.01 is considered excellent, 0.05 good, and 0.08 mediocre; the current score of 0.07 is therefore within the good to mediocre score range. Values larger than 0.10 indicate poorly fitting models, but values from 0.05 to 0.08 represent reasonable errors of approximation. In addition, models with smaller sample sizes can have artificially large values for the RMSEA, so the large size of the current sample ($N = 12,436$) protected against inflation of the current RMSEA. The narrow width of the CI indicated that the RMSEA was accurate.

The CFI was 0.953, above the recommended 0.95 standard for an excellent fit. The TLI was 0.945, below the recommended 0.95 standard for an excellent fit. However, CFI and TLI are usually considered acceptable when greater than 0.90, and the TLI value of 0.945 was considered adequate. Thus, the hypothesized two-factor Peplau model produced an acceptable to good fit to the data.

IOM model—In contrast to the acceptable fit of the Peplau model, the nine-factor IOM model performed extremely well. As with the Peplau model, all items loaded onto their anticipated latent factors, and no outliers were identified (Cook's $D_s < 1.00$; range = 0.0-0.16). In contrast to the mediocre to good score ranges found in the Peplau model, overall indicators of the nine-factor model fit were excellent. The RMSEA was 0.027, 90% CI (0.024, 0.028), well below the cutoff of 0.05 for a good model fit. The calculated probability that the true RMSEA value was <0.05 was 1.00, confirming the strong fit of the model. The CFI was 0.995, which was above the recommended 0.95 standard for excellent. The TLI was 0.993, also above the recommended 0.95 standard for excellent.

Formal model comparison—The BIC, which accounts for the number of items in a model, can be used to compare the relative fit of two models to the exact same data—as was the case in the current study. The BIC for the Peplau model, 276,596, was slightly larger than the BIC for the IOM-based model, 270,482, suggesting that the IOM-based model fit

these data better than the Peplau-based model. The two models were also compared using log likelihood, which further supported the better fit of the IOM-based model ($\chi^2 = 129.74$, $df = 20$, $p < .0001$).

Ancillary Analyses

In light of these findings and bearing Peplau's original three-phase model in mind, modification indices (MIs) were inspected to identify adjustments to the two-factor Peplau-based model that would improve its fit. In particular, correlations between items' residual variances were considered when theoretically relevant. A correlation between the residual variances ($MI = 750.264$) was found between the answers to HCAHPS Item 1 ("During this hospital stay, how often did nurses treat you with courtesy and respect?") and Item 2 ("During this hospital stay, how often did nurses listen carefully to you?"). This correlation was consistent with the *orientation* phase in Peplau's (1952/1991/1997) original three-phase theory. It was thus considered that the originally hypothesized two-factor model was insufficient and that the orientation phase is a stand-alone phase and may not be subsumed by the other two phases.

The two-factor Peplau-based model was therefore modified to include a third latent factor (orientation), and a CFA was run on this new model (see Figure 3). The three-factor model resulted in an improved fit ($RMSEA = 0.068$ [CI 0.066, 0.069; probability of $RMSEA \leq .05 = 1.00$], $CFI/TLI = 0.958/0.950$, $\chi^2 = 5,879.320$, $df = 101$, $p < .0001$).

The three-factor model's MIs were then inspected to identify adjustments to the three-factor model that would improve the fit. Inspection of the MIs revealed relevant relationships between six items' residual variances: (a) items 13 and 14 ($MI = 3,156.404$) (pain management), (b) items 16 and 17 ($MI = 716.663$) (medication teaching), and (c) items 2 and 3 ($MI = 515.364$) (nurses listening carefully and explaining). These were the largest relationships between residuals compared to the remaining correlations (all lower than 339.712). The inclusion of these relationships further improved the fit of the three-phase Peplau model ($RMSEA = 0.039$ [CI 0.038, 0.041; probability of $RMSEA \leq .05 \approx 1.00$], $CFI/TLI = 0.986/0.983$, $\chi^2 = 1,975.173$, $df = 98$, $p < .0001$). As noted previously, a $RMSEA$ score of 0.01 is considered excellent, 0.05 good, and 0.08 mediocre. 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.

Model comparison—The BIC for the three-factor Peplau model (271,660) was considerably lower than the two-factor Peplau-based model (276,596; a difference of 4,936). More tellingly, it was close to the IOM-based model (270,482; a difference of 1,178).

Discussion and Conclusions

This study investigated whether a broader consideration of nursing's contributions to the experiences of hospitalized patients was supported by conceptualizing items on the HCAHPS survey through a Peplau-based latent factor structure. It was argued that if the fit of a Peplau-based model to a large, representative HCAHPS survey data set was comparable to the fit of the original IOM-based latent factor structure, then this would bolster a broader consideration of nursing's contributions. The initial, two-factor Peplau-based model did not

fit the data as well as a three-factor model that included Peplau's orientation phase. In fact, the three-factor model including the orientation phase fit the data nearly as well as the IOM-based model and provided a suitable alternate factor structure for the data.

The orientation phase was described by Peplau (1997) as a time for introductions and listening on the part of nurses: "The *orientation* of nurse to patient is mostly a one-way contact: the nurse first identifies herself [sic] 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" (Peplau, 1997, 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" (Peplau, 1992, p. 164).

In prior research, patients who reported experiencing respect and careful listening by nurses tended to have more successful transitions from the orientation to the working phase (Forchuk et al., 1998). 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). 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 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, pp. 39-40). The HCAHPS survey Item 1 ("During this hospital stay, how often did nurses treat you with courtesy and respect?") and Item 2 ("During this hospital stay, how often did nurses listen carefully to you?") appear to reflect the orientation phase. Including them as such helped produce a relatively well-fitting model.

In more recent quantitative research, Otani, Herrmann, and Kurz (2011) found that nursing care was the most influential factor when tested against staff care, physician care, and environment. More importantly, Otani and colleagues (2011) found that *within* the nursing care factor, the first and second most influential empirical variables were answers to HCAHPS Items 1 and 2. These two items appear to be more empirically linked than was initially thought in the current study's initial hypotheses. Testing of a more theoretically accurate three-factor model of Peplau's (1952/1991/1997) theory showed that the three-factor model was a better fit to the data than the two-factor model. These results supported Peplau's theory and supported a broader, Peplau-based consideration of nursing's contributions to the experiences of hospitalized patients, as measured by the HCAHPS survey.

Applications to Nursing Practice

The professional scope of nursing practice is multidimensional and comprehensive. In their report on the future of nursing, IOM (2011) 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 use of the HCAHPS survey, researchers have found that nursing has more influence than any of the other factors on patients' overall experiences (Jha et al., 2008). Recent research continues to support that nursing care is significantly, positively related to many items on the HCAHPS survey that were not initially framed as being under the purview of nurses, such as discharge planning and medication communication (Martsolf et al., 2016). The current study demonstrated that the HCAHPS survey touches on many facets of nursing practice and that the HCAHPS can be used as a valuable tool to more broadly measure patients' experiences with nursing care. As the HCAHPS 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.

Applications to Nursing Research

Quantitative studies are well-suited for testing middle-range theories of nursing (Fawcett, 2005; Im, 2015). Despite the importance of theory-testing, basic research in this area has decreased in the last two decades (Im, 2015). This study adds to nursing science by acting as a test of Peplau's (1952/1991/1997) middle range of interpersonal relations in nursing, a well-known and seminal theory that despite its age has not undergone much formal testing.

Limitations

The generalizability of the study is primarily limited by the restriction of data to one hospital system and the response rate (~20%) to the HCAHPS survey. In addition, the need to eliminate about 20% of the data due to the missing data further limits some of the representativeness of the sample.

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Figure 1.
Path Diagram of 16 HCAHPS Items That Correspond to Peplau's Phases.

Figure 2.
CFA Peplau Model.

Figure 3.
CFA Peplau Model With Three Factors.

Table 1

Frequency Table—Demographic Variables.

	n	%
Sex		
Male	5,268	42.36
Female	7,168	57.64
Age (in years)		
18 to 44	3,743	30.81
45 to 64	3,524	28.34
65 and over	5,169	41.56
Length of hospital stay		
3 days	7,765	62.44
>3 days	4,671	37.56
Race		
White	7,212	57.99
Hispanic	2,087	16.78
Black	943	7.58
Asian	1,021	8.21
Multiple races/ethnicities	139	1.12
Native Hawaiian/Pacific Islander	21	0.17
Native American or Alaska Native	39	0.31
Did not report	974	7.83
Language spoken at home		
English	8,884	71.44
Spanish	1,309	10.53
Chinese	342	2.75
Russian	141	1.13
Vietnamese	1	0.008
Other	405	3.26
Did not report	1,354	10.89
Education level		
8th grade or less	703	5.65
Some high school, did not graduate	690	5.55
High school graduate or GED	1,828	14.70
Some college/2-year college	2,165	17.41
4-year college	2,455	19.74
More than 4-year college degree	4,022	32.34
Did not report	573	4.61
Admitted through the emergency department		
Yes	4,538	36.49
No	7,521	60.48
Did not report	377	3.03