Patient Preference and Adherence

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ORIGINAL RESEARCH

Development and Psychometric Test of the Inpatients Experiences Measurement Scale (IEMS)

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Purpose: In South Korea, hospitalized patients' experiences significantly impact satisfaction and treatment outcomes. This study developed and evaluated the Inpatients Experience Measurement Scale (IEMS) for its psychometric properties.

Patients and Methods: Participants from three hospitals were recruited using convenience sampling. Scale item generation involved patient interviews and a Delphi survey with experts. Psychometric testing used Exploratory Factor Analysis (EFA) with 150 participants and Confirmatory Factor Analysis (CFA) with 151 participants.

Results: A total of 301 patients participated, resulting in a 20-item scale across four factors: "Care Quality and Information Provision", "Patient Safety and Dietary Services", "Facility and Comfort Infrastructure", and "Comprehensive Patient Support Services". Rated on a 5-point Likert scale, the scale showed a high Content Validity Index (CVI) over 0.80. EFA explained 61.43% of the variance. The four-factor model was validated using CFA with favorable fit indices. The IEMS demonstrated strong convergent validity, supported by high composite reliability (CR) and average variance extracted (AVE) values. Significant correlations with the Patient Satisfaction Scale reinforced its convergent validity. Discriminant validity was confirmed, and all reliability measures exceeded the minimum threshold of 0.80.

Conclusion: The IEMS effectively captures inpatients' experiences, demonstrating robust reliability and validity. This scale is a valuable tool for assessing patient experiences, facilitating enhancements in patient care and satisfaction within hospital settings.

Keywords: inpatients, experience, psychometrics, validation, factor analysis

Introduction

The enhancement of patient experience as a fundamental aspect of healthcare provision has significant ramifications for patient preference and adherence.[1] There is a crucial link between patient experience and adherence in healthcare settings, with improvements in the former potentially leading to considerable increases in the latter.[2] This enhancement is vital for the success of treatment plans, the management of chronic illnesses, and the overall elevation of health outcomes.

Accurately gauging patient experiences in healthcare settings is of paramount importance as it directly impacts the quality of care and patient satisfaction.[3] Patient experience is defined as "the sum of all interactions, shaped by an organization's culture, that influence patient perceptions across the continuum of care".[4] However, it is essential to recognize that patient experience encompasses more than just patient satisfaction.[5] It reflects occurrences and events that happen independently and collectively across the continuum of care and includes individualized care, patient expectations, and the realization of those expectations.[6] Patients need caregivers to assess the human dimensions of their experience, as illness and treatment hold deeper significance for them than measurable clinical outcomes or cost-effective interventions.[7]

In South Korea, patient satisfaction surveys are commonly conducted to evaluate the quality of healthcare services, they often fall short of capturing the full scope of patient experiences within hospital environments. Understanding what patients actually experience in these settings remains under-researched. Furthermore, the experiences of inpatients differ significantly from general patient experiences, highlighting the need for specialized studies in this area. Inpatients care is characterized by its complexity and the extended nature of hospital stays, which demands an advanced evaluative

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approach. The focus on inpatients experiences is diverse, encompassing patients' extensive and intense interactions with the healthcare system during serious health challenges.[8] These interactions include the quality of medical care and the level of comfort provided by the hospital environment, offering deep insights into the care's effectiveness and compassionate delivery.[9]

Currently, instruments like the Picker Patient Experience Questionnaire[10] and the Consumer Assessment of Healthcare Providers and Systems (CAHPS) survey[11] offer comprehensive frameworks for evaluating patient experiences. The Picker Questionnaire focuses on key aspects such as patient preferences and care coordination, while CAHPS emphasizes communication and access to healthcare services.[12] However, these tools face limitations in fully capturing the range of inpatients experiences in various medical systems, often falling short in addressing the intricacies of hospital stays, including essential factors like the hospital environment, continuity of care, and emotional support.[13] Moreover, there is a paucity of psychometric instruments developed to examine the inpatients experience, with few efforts addressing specific aspects of psychometrics in non-Western settings.

In the context of South Korea, where the healthcare sector is undergoing substantial changes and advancements,[14] there is a pressing need for inpatients experience measurement tools that adequately reflect the unique contextual and cultural aspects. The South Korean healthcare system is deeply influenced by Confucian values,[15,16] which emphasize respect for authority and the importance of family, thereby affecting patient-provider interactions.[15,17] Traditionally, family members are actively involved in caregiving, often staying in hospitals to assist with patient care. However, the COVID-19 pandemic has necessitated modifications to this practice, limiting the physical presence of family caregivers in hospitals due to health safety protocols. Despite these changes, the cultural norm of family involvement remains significant.

Thus, a measurement tool adept at identifying these cultural subtleties is essential for obtaining accurate and meaningful insights into inpatients experiences in this specific environment.[7] Therefore, this study endeavors to undertake the development and validation of the Inpatients Experience Measurement Scale (IEMS), specifically tailored for the South Korean setting. Through this endeavor, it aims to contribute significantly to the revolution of patient care, incorporating cultural insights, enhancing healthcare quality, and informing the development of patient-centric healthcare policies.

By tailoring and validating the IEMS for the South Korean context, this research aspires to transform patient care. The IEMS will provide a robust framework for evaluating inpatients experiences, enabling healthcare facilities to better tailor their services to meet patient needs. Consequently, this will enhance patient outcomes and satisfaction. This study, therefore, makes a significant contribution to advancing healthcare quality and promoting patient-centered care practices in South Korea.

Materials and Methods

Study Design

This research constituted a methodological investigation focused on developing and evaluating the IEMS. It entailed a detailed process of formulating the scale's components, followed by a thorough examination of its psychometric validity and reliability. The study was structured in two distinct stages: firstly, the generating of the scale items, and secondly, the testing of the psychometric properties.

Phase 1: Generating of the Scale Items

In the field of measurement scale development, a systematic and methodologically rigorous approach is essential. The item generation stage is a key component in this process, significantly influencing the scale's final structure and effectiveness. As highlighted in the prior research by Clark and Watson[18] and DeVellis,[19] this phase is critical in determining the scale's accuracy and utility. The majority of scale development research predominantly relies on literature reviews for item generation. MacKenzie et al[20] noted that 84.7% of such studies use this deductive method, which could potentially lead to a disconnection from the real-life experiences and perspectives of the end-users. In contrast, only 26.6% of studies use inductive methods, such as interviews, which more effectively integrate the viewpoints of those for whom the scale is intended.

In our study, the development of the IEMS began with an extensive literature review and interviews with seven patients to capture the intricacies of hospital experiences. These patients were selected based on a diverse range of characteristics, including age, gender, and type of care received. They were approached through coordination with hospital staff and were informed about the study's purpose and confidentiality measures. Structured interviews provided in-depth insights into their hospital experiences, leading to the initial identification of 40 potential items for the scale. These items were categorized into four factors: Information Provision (20 items), Safety Services (8 items), Comfort Infrastructure (8 items), and Support Services (4 items). Issues unique to Korean hospital culture, such as noise from family caregivers and meal management, were highlighted.

To refine and validate these items, a two-phase Delphi survey was conducted with a panel of 10 experts, including four senior nurses, three researchers, and three nursing professors. In the first phase, experts reviewed the 40 items for clarity, relevance, and comprehensiveness using a 5-point Likert scale. An expert opinion section was included to allow suggestions for modifications or additions. This feedback helped in consolidating similar questions, removing duplicates, and revising content. Content validity was verified using the Content Validity Index (CVI) proposed by Lawshe,[21] with scores of 4 and 5 deemed appropriate. This process resulted in the removal of 18 questions (16 due to redundancy and 2 dues to unsuitability), leaving 22 questions for further review.

In the second phase, a more rigorous content validity method by Gilbert and Prion[22] was employed. Instead of a 5-point Likert scale, questions were rated as "Essential", "Necessary but not essential", or "Not necessary", with "Essential" responses considered appropriate. This phase aimed to ensure each question was crucial for explaining the sub-elements of the inpatients experience. Two additional questions were deleted, resulting in a final set of 20 items. This iterative Delphi process, combining quantitative ratings with qualitative feedback, ensured that the final set of 20 items was both relevant and clear. This comprehensive approach, blending expert opinions with patient insights, resulted in a validated scale for assessing inpatients experiences in hospital settings.

A pilot study with 10 inpatients tested the clarity and reliability of the draft 20-items IEMS questionnaire. The results showed no issues with understanding the items or identifying awkward terms. The survey took approximately 5 to 10 minutes to complete, confirming the questionnaire's clarity and reliable, accurately reflecting the breadth and depth of inpatients experiences.

Phase 2: Testing of Psychometric Properties

Following the EFA, the revealed factor structure was used to develop a measurement model. This model was then tested using Confirmatory Factor Analysis (CFA) with 151 responses to verify whether each item appropriately measured the intended construct. We conducted analyses for the 4-factor model, unidimensional model, and second-order model, comparing their fit indices.

The convergent validity of the items was assessed by hypothesizing a significant positive correlation between the scale and a related construct, such as Patient Satisfaction, and analyzing their correlation. The average variance extracted (AVE) values for each factor were calculated to ensure they exceeded 0.50, indicating acceptable convergent validity. For the discriminant validity of the items, the AVE values of the sub-factors were compared to the squared correlations between sub-factors to ensure the AVE values were greater.

To confirm the reliability of the scale, various methods were employed, including Cronbach's alpha, split-half reliability, test-retest reliability, McDonald's omega, and the Spearman-Brown formula to assess the stability of the tool. This comprehensive approach ensured the robustness and practical relevance of the scale.

Participants and Data Collection

Participants were recruited from three hospitals in the Gwangju metropolitan area, each contributing to the study sample. The recruitment targeted a diverse patient population, and approvals were obtained from hospital administrations to access patient lists. Recruitment spanned three months, with trained personnel ensuring consistent participant briefing and adherence to ethical standards. Due to the COVID-19 pandemic, the survey followed strict infection control measures and hygiene guidelines.

Eligible participants were adult inpatients (aged 18 and above) who had been hospitalized for at least three days to ensure adequate exposure to hospital services. Those with cognitive impairments or severe psychiatric conditions that could affect their ability to provide informed consent or reliable responses were excluded. Following IRB approval, permissions were granted by the heads of the nursing departments in the participating hospitals. Two research assistants distributed questionnaires, emphasizing confidentiality and the study's purpose. Participants were informed of their right to withdraw at any time and provided informed consent before completing the 15-minute questionnaire. A small token of appreciation was given to each participant.

Hospital A initially recruited 120 participants, Hospital B 110 participants, and Hospital C 100 participants. The overall refusal rate was 9%, with specific rates of 7% for Hospital A, 11% for Hospital B, and 9% for Hospital C. After excluding incomplete responses, the final sample included 112 from Hospital A, 98 from Hospital B, and 91 from Hospital C, totaling 301 participants.

Data collection for the EFA took place between June 22 and July 31, 2020, and for the CFA, between November 10 and December 20, 2021. For the EFA, 170 questionnaires were distributed, and 150 were returned, with 20 excluded due to incomplete responses. For the CFA, 160 questionnaires were distributed, and 151 were returned and analyzed, with 9 excluded for similar reasons. The sample size calculation was based on factor analysis guidelines,[23] recommending at least 5 to 10 participants per item. Given that the scale had 20 items, a minimum of 100 to 200 participants was ideal. Therefore, a sample size of 301 was deemed sufficient for both EFA and CFA.

Instrument

To validate the convergent validity of the developed IEMS, we employed the Patient Satisfaction Scale (PSS) created by Yoon,[24] which is the most widely used Instrument for assessing healthcare quality in Korea. This tool comprises 14 items categorized into three factors: staff friendliness (3 items), hospital environment (3 items), and convenience of use (8 items). Each item is evaluated by patients on a 5-point Likert scale (1: not at all ~ 5: very much so), with higher total scores indicating greater patient satisfaction.

Data Analysis

The data for this study were analyzed using SPSS 27.0 and AMOS (IBM Corp., Armonk, NY, USA). Continuous variables were reported as means and standard deviations (SD), while categorical variables were described using frequencies and percentages. The psychometric properties of the IEMS were assessed for both validity and reliability, with the significance level (α) generally set at 0.05.

The EFA was conducted using the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test of sphericity to ensure the suitability of the data for factor analysis. Principal component analysis and varimax rotation was employed to extract factors.[25] The number of factors was determined based on the scree plot and eigenvalues.

The CFA was performed to validate the factor structure identified by the EFA. We conducted analyses for the 4-factor model, unidimensional model, and second-order model, comparing their fit indices. Model fit was evaluated using several indices: chi-squared statistic ($\chi2/df \leq 3.00$), standardized root mean square residual (SRMR $\leq$ 0.08), root mean square error of approximation (RMSEA $\leq$ 0.06), comparative fit index (CFI $\geq$ 0.95), Tucker-Lewis index (TLI $\geq$ 0.95), and normed fit index (NFI $\geq$ 0.80). These fit indices were selected based on the criteria established by Morin et al.[19]

Convergent validity of the scale was examined by analyzing the correlation between the IEMS scores and a related construct, Patient Satisfaction, using Pearson's correlation test. Additionally, to verify the convergent and discriminant validity of the items, standardized regression coefficients (β), composite reliability (CR $\geq$ 0.80), and average variance extracted (AVE $\geq$ 0.50) were calculated.

Discriminant validity was further assessed using the Fornell-Larcker criterion,[26] by comparing the maximum shared variance (MSV $\leq$ 0.80) with the square root of the AVE values for each factor to ensure they were greater than the inter-factor correlations.

Finally, the reliability of the scale was confirmed using various methods, including Cronbach's alpha, split-half reliability, test-retest reliability, McDonald's omega, and the Spearman-Brown formula. Reliability coefficients of 0.70 or above were considered acceptable, while values of 0.80 or higher were deemed good.[27]

Ethical Considerations

This study was approved by the Institutional Review Board of Chonnam National University Hospital (IRB no. CNUH-2020-032). The questionnaire was administered after obtaining written informed consent from all patients to participate. All procedures were conducted following the ethical standards of the Helsinki Declaration.

Results

Sample Characteristics

The demographic characteristics of participants are shown in Table 1. In the study, a total of 301 participants were involved, with 150 allocated to the EFA group and 151 to the CFA group. Regarding gender distribution, the study featured 161 males (53.5%) and 140 females (46.5%). Within the EFA group, there were 79 males (52.7%) and 71 females (47.3%), while the CFA group consisted of 82 males (54.3%) and 69 females (45.7%). The participants were characterized by a notable average age of 52.28 (SD =17.09) years. A total of 34 participants had education up to primary school or below (11.3%), 35 had completed middle school (11.6%), 107 were high school graduates (35.5%), 52 had junior college degrees (17.3%), and 73 held Bachelor's degrees or higher qualifications (24.3%). Regarding economic status, 32 participants were classified as having a high economic status (10.6%), 200 were in the middle economic bracket (66.4%), and 69 were categorized as low (22.9%). Participants' economic status was categorized based on self-reported income levels relative to the national average. High economic status was defined as having an income significantly above the national average, middle economic status as around the national average, and low economic status as significantly below the national average. In terms of insurance status, 191 were covered by Public Health Insurance (63.5%), 31 had Medicaid (10.3%), and 79 were insured through Commercial Insurance (26.2%). The frequency of inpatients visits among the participants was also noted, with 121 visiting for the first time (40.2%) and 180 having been inpatients two times or more (59.8%).

Table 1 Demographic Characteristics of the Participants (N=301)

Characteristics	Total (N=301)	EFA (N_1=150)	CFA (N_2=151)	t/x^2	P
Gender					
Male	161	79	82	0.081	0.776
Female	140	71	69		
Age [mean (SD)]	52.28 (17.09)	51.57 (16.68)	52.99 (17.52)	−0.720	0.472
Education					
Primary School or below	34	17	17	1.079	0.956
Middle School	35	17	18		
High School	107	54	53		
Junior College	52	26	26		
Bachelor's degree or above	73	36	37		
Economy Status					
High	32	16	15	0.301	0.990
Middle	200	100	101		
Low	69	34	25		
Insurance Status					
Public Health Insurance	191	95	96	0.047	0.977
Medicaid	31	16	15		
Commercial Insurance	79	39	40		
Inpatient Visits					
First Time	121	59	62	0.125	0.724
Second Time or above	180	92	88		

Abbreviations: SD, standard deviation; EFA, exploratory factor analysis, CFA, confirmatory factor analysis.

Validity Analysis

Construct Validity Based on EFA

The Results of construct validity based on EFA are shown in Table 2. The analysis of skewness and kurtosis to determine the normality of data showed that skewness values for all measured variables were below 1.701, and kurtosis values were under 3.816. This indicates that the data met the criteria for univariate normality. In the context of the IEMS, the EFA conducted has revealed significant insights into the underlying structure of the measurement tool. The Kaiser-Meyer-Olkin (KMO) measure yielded a value of 0.915, and Bartlett's test of sphericity for appropriate assumptions was significant (χ^2=1955.634, p<0.001), robustly confirming the data's suitability for factor analysis. This suitability is further evidenced by the comprehensive extraction of factors through Principal Component Analysis (PCA) on the 20 items of the IEMS, employing varimax rotation to elucidate the relationships between items and their corresponding factors.

The PCA results, particularly the scree plot analysis, indicated a clear demarcation at four distinct factors. Four factors were extracted based on eigenvalues ≥1, and the scree plot yielded a four-factor solution as well, collectively

Table 2 Item Analysis and Factor Loadings for the Inpatient Experiences Measurement Scale

No.	Items	Mean (SD)	Skewness	Kurtosis	Communality	Factor Loading
Factor 1: Care Quality and Information Provision (Eigenvalue=4.99, % of variance=24.98%)						
v1	Received equitable treatment similar to other patients during hospitalization.	4.49 (0.73)	−1.701	3.816	0.738	0.785
v2	Hospital staff were considerate to prevent discomfort during examinations and treatments (eg, during physical exposure).	4.52 (0.68)	−1.356	1.516	0.737	0.762
v3	Nurses behaved politely and courteously towards you.	4.53 (0.64)	−1.047	0.006	0.711	0.736
v4	Physicians behaved politely and courteously towards you.	4.65 (0.04)	−1.181	0.403	0.589	0.701
v5	Administrative staff behaved politely and courteously towards you.	4.55 (0.53)	−1.284	1.108	0.648	0.700
v6	Hospital staff made efforts to maintain the security of your personal information.	4.49 (0.65)	−0.922	−0.239	0.656	0.681
v7	Medical staff encouraged your involvement in decisions regarding treatments and procedures.	4.37 (0.83)	−1.342	1.696	0.509	0.677
v8	Medical staff provided comfort and empathy in addressing your anxieties and fears.	4.09 (0.94)	−0.894	0.364	0.584	0.589
v9	Scheduled physical exams or procedures were conducted at the appointed times.	4.27 (0.85)	−1.334	2.068	0.578	0.480
Factor 2: Patient Safety and Dietary Services (Eigenvalue=3.12, % of variance=15.59%)						
v10	The hospital has adequate patient safety facilities (eg, safety handrails in corridors, and non-slip mats in bathrooms).	3.56 (1.22)	−0.468	−0.641	0.725	0.855
v11	Meal service staff provided hospital meals with kindness.	3.55 (1.13)	−0.340	−0.727	0.715	0.769
v12	The temperature of the food provided during the hospital stay was appropriate.	3.38 (1.24)	−0.398	−0.721	0.489	0.625
v13	Hospital signage or guides were well-equipped (floor-specific guides, directional arrows, etc.).	3.87 (1.06)	−0.621	−0.413	0.623	0.556
v14	During the hospital stay, the hospital allowed the choice of preferred food.	4.27 (0.84)	−1.032	0.764	0.602	0.484

(*Continued*)

Table 2 (Continued).

No.	Items	Mean (SD)	Skewness	Kurtosis	Communality	Factor Loading
Factor 3: Facility and Comfort Infrastructure (Eigenvalue=2.54, % of variance=12.69%)						
v15	The hospital had adequate spaces for relaxation (walkways and conversation areas).	4.17 (0.78)	−0.575	−0.400	0.704	0.724
v16	The hospital parking facilities were convenient to use.	4.41 (0.70	−0.896	−0.006	0.602	0.716
v17	Noise management in hospital rooms was well-maintained during the hospital stay (eg, guidelines or requests for cooperation regarding late-night cellphone use, TV watching, and loud conversations).	4.21 (0.75)	−0.565	−0.335	0.604	0.581
v18	Hospital amenities for patients (cafes, in-house restaurants, convenience stores, computer use areas, etc.) were sufficient.	3.58 (1.25)	−0.440	−0.950	0.458	0.435
Factor 4: Comprehensive Patient Support Services (Eigenvalue=1.61, % of variance=8.06%)						
v19	Received services supporting personal religious activities during the hospital stay.	2.73 (1.40)	0.382	−1.107	0.588	0.751
v20	Received services promoting emotional well-being during the hospital stay (music therapy, laughter therapy, massage therapy, relaxation techniques, etc.).	3.05 (1.3.)	−0.004	−1.009	0.477	0.704

Notes: Extraction method: principal component analysis, Rotation method: varimax method.
Abbreviation: SD, standard deviation.

accounting for 61.43% of the total variance observed in the scale. This significant percentage of variance explained by these factors underscores the multidimensional nature of the IEMS. Post-rotation, the factor loadings ranged from 0.435 to 0.855, affirming the strong linkage between the items and the extracted factors.

The resulting factors, each representing a unique dimension of the inpatients experience, were identified as follows: Factor 1, labeled "Care Quality and Information Provision", comprises nine items and explains 24.98% of the variance. Factor 2, termed "Patient Safety and Dietary Services", consists of five items and accounts for 15.59% of the variance. Factor 3, designated as "Facility and Comfort Infrastructure", involves four items and contributes 12.69% of the variance. Lastly, Factor 4, named "Comprehensive Patient Support Services", includes two items and explains 8.06% of the variance.

Construct Validity Based on CFA

In this study, we compared the fit indices of various CFA models to evaluate their adequacy. Table 3 presents the fit indices for each model. The 4-factors model demonstrates excellent fit for most indices, except for the NFI, which

Table 3 Fit Indices from the CFA Model of the Scale

Fitness index	χ^2 (p)	χ^2/df	CFI	TLI	NFI	SRMR	RMSEA
Criteria	>0.05	≤3.00	≥0.95	≥0.95	≥0.80	≤0.08	≤0.06
4-factors model	309.849 (<0.001)	2.345	0.951	0.950	0.851	0.071	0.058
Unidimensional model	680.402 (<0.001)	4.002	0.728	0.696	0.671	0.094	0.141
Second order model	343.076 (<0.001)	2.067	0.906	0.892	0.834	0.074	0.084

Abbreviations: df, degrees of freedom; CFI, comparative fit index; NFI, normed fit index; RMSEA, root mean square error of approximation; SRMR, standard root mean residual; TLI, Tucker–Lewis index.

remains within an acceptable range. Overall, this model provides a generally well-fitting representation of the data. The model's chi-square to degrees of freedom ratio was 2.345 ($\chi2/df$ = 2.345, CFI = 0.951, TLI = 0.950, NFI = 0.851, SRMR = 0.071, RMSEA = 0.058), suggesting a reasonable fit.

In contrast, the unidimensional model shows poor fit across all indices, indicating that it does not adequately capture the complexity of the data. The fit indices for this model ($\chi2/df$ = 4.002, CFI = 0.728, TLI = 0.696, NFI = 0.671, SRMR = 0.094, RMSEA = 0.141) all fall outside acceptable ranges, suggesting significant limitations in representing the underlying constructs.

The second order model shows acceptable fit for several indices but does not perform as well as the 4-factors model. While the $\chi2/df$ and SRMR values suggest a reasonable fit, the CFI, TLI, and RMSEA indices indicate room for improvement. The fit indices for this model are $\chi2/df$ = 2.067, CFI = 0.906, TLI = 0.892, NFI = 0.834, SRMR = 0.0745, RMSEA = 0.084. This model may be suitable if there is theoretical justification for a hierarchical structure, but it is not the optimal solution compared to the 4-factors model.

Given these results, the 4-factors model emerges as the most appropriate choice for representing the data. It provides a robust and well-fitting solution that aligns with most of the fitness criteria. These indices collectively indicate a satisfactory model fit. The bootstrapped standardized item loadings for this model are presented in Figure 1.

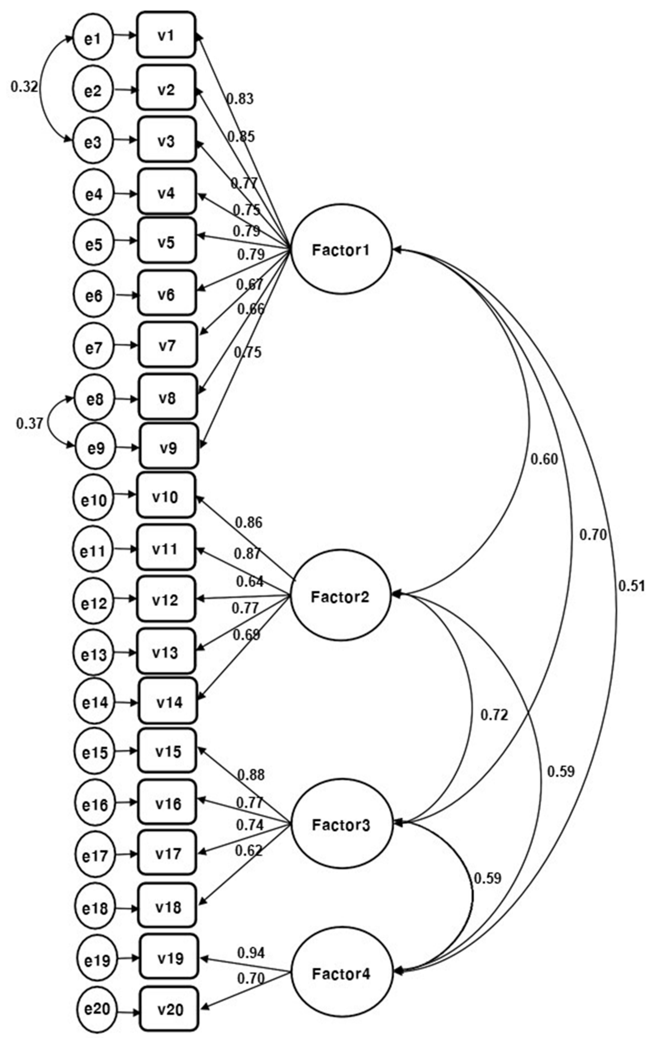

Figure 1 The bootstrapped standardized path diagram of the CFA model (N2=151).
Notes: v1 to v20 represent the items of the IEMS; e: measurement error.

Convergent Validity

Convergent validity evaluates the degree to which multiple indicators of the same construct correlate and agree. Establishing convergent validity involves considering the factor loadings, composite reliability (CR), and average variance extracted (AVE). According to the literature, an AVE value exceeding 0.50 is deemed adequate for convergent validity.[28,29]

In our study, the assessment of convergent validity is presented in Table 4. The results demonstrate that all factors exhibit high construct reliability (CR), with values ranging from 0.811 to 0.920, indicating strong internal consistency. Furthermore, the AVE values for all factors exceed the recommended threshold of 0.5, suggesting good convergent validity. Specifically, the AVE values are 0.565 for Factor 1 (Care Quality and Information Provision, CQIP), 0.594 for Factor 2 (Patient Safety and Dietary Services, PSDS), 0.574 for Factor 3 (Facility and Comfort Infrastructure, FCI), and 0.687 for Factor 4 (Comprehensive Patient Support Services, CPSS).

Additionally, we examined the correlation between the IEMS and PSS, a relationship well-documented in the literature.[1,30,31] The findings indicate a strong positive correlation between the overall IEMS score and patient satisfaction ($r = 0.920$, $p < 0.001$). Significant correlations were also observed between the four sub-factors of the IEMS and patient satisfaction: Factor 1 (CQIP) with a correlation of 0.792 ($p < 0.001$), Factor 2 (PSDS) with a correlation of 0.795 ($p < 0.001$), Factor 3 (FCI) with a correlation of 0.772 ($p < 0.001$), and Factor 4 (CPSS) with a correlation of 0.639 ($p < 0.001$). These results affirm the convergent validity of the IEMS.

Discriminant Validity

The discriminant validity of the IEMS is summarized in Table 4. Discriminant validity was supported by the Maximum Shared Squared Variance (MSV) values, which were lower than the corresponding AVE values for each factor. The MSV values were 0.490, 0.511, 0.510, and 0.345 for Factors 1, 2, 3, and 4, respectively. Furthermore, the square roots of the AVE values (displayed on the diagonal of the correlation matrix) were higher than the off-diagonal inter-factor correlations, confirming discriminant validity according to the Fornell-Larcker criterion.[26] The correlations between factors were statistically significant at p-value < 0.001, with values such as 0.604, 0.700, and 0.513 for Factor 1 (CQIP) with other factors, 0.715 and 0.587 for Factor 2 (PSDS), with other factors, and 0.587 for Factor 3 (FCI) with Factor 4 (CPSS). These results confirm that the IEMS is both a reliable and valid tool for assessing inpatients experiences across multiple dimensions.

Reliability Analysis

The results of the reliability of the IEMS across its four factors are shown in Table 5. All reliability measures (Cronbach's alpha, split-half reliability, test-retest reliability, and McDonald's omega) exceeded the minimum threshold of 0.80, confirming the Scale's reliability. McDonald's omega generated all possible subscales of at least three items from an additive scale with k items.[32] However, the fourth factor of the IEMS consists of only two items, so the Spearman-Brown reliability estimate was applied.[33] This method ensures a thorough evaluation of reliability across subscales, providing a comprehensive understanding of the internal consistency of the measurement tools.

Table 4 Results of Convergent and Discriminant Validity Analysis

Factors	CR	AVE	MSV	Factor 1	Factor 2	Factor 3	Factor 4
Factor 1	0.920	0.565	0.490	0.752[a]			
Factor 2	0.878	0.594	0.511	0.604***	0.771[a]		
Factor 3	0.842	0.574	0.510	0.700***	0.715***	0.758[a]	
Factor 4	0.811	0.687	0.345	0.513***	0.587***	0.587***	0.829[a]

Notes: Factor 1: Care Quality and Information Provision, Factor 2: Patient Safety and Dietary Services, Factor 3: Facility and Comfort Infrastructure, Factor 4: Comprehensive Patient Support Services; [a]Value in the diagonal element is the square root of AVE for each construct, ***Statistically significant at P-value<0.001.

Abbreviations: CR, construct reliability; AVE, average variance extracted; MSV, maximum shared squared variance.

Table 5 Reliability of the Inpatient Experiences Measurement Scale

Factors	Cronbach's α	Split-Half Reliability	Test-Retest Reliability	McDonald's omega
Factor 1	0.922	0.879	0.914	0.914
Factor 2	0.872	0.735	0.869	0.879
Factor 3	0.835	0.765	0.798	0.802
Factor 4	0.794	0.793	0.793	0.765[a]
Total	0.940	0.840	0.929	0.929

Notes: Factor 1: Care Quality and Information Provision, Factor 2: Patient Safety and Dietary Services, Factor 3: Facility and Comfort Infrastructure, Factor 4: Comprehensive Patient Support Services; [a]Value of Spearman-Brown Reliability Estimate.

Discussion

Enhancing patient experience is crucial for improving health outcomes and adherence. Influenced by Confucian values, South Korea's healthcare system needs a culturally sensitive measurement tool. Previous instruments fail to capture the complexity of inpatients experiences and do not address key factors like the hospital environment and emotional support. Therefore, this study developed and validated the IEMS to improve healthcare quality and patient satisfaction.

First, the EFA results indicated that the data met univariate normality criteria, with a KMO value of 0.915 and a significant Bartlett's test, supporting the data's suitability for factor analysis. PCA with varimax rotation identified four distinct factors, accounting for 61.43% of the total variance. The four key factors were named based on their item content: "Care Quality and Information Provision", "Patient Safety and Dietary Services", "Facility and Comfort Infrastructure", and "Comprehensive Patient Support Services", each capturing essential aspects of inpatients care.

Factor 1, "Care Quality and Information Provision", includes nine critical elements: equitable treatment, minimizing discomfort during examinations and treatments, courteous behavior from nurses, doctors, and administrative staff, privacy protection, patient involvement in treatment, empathy for patient anxiety and fear, and timely provision of therapeutic activities. This factor underscores the significance of delivering high-quality medical care alongside clear and accessible information, empowering patients and facilitating their active participation in their healthcare journey.[13,34,35] This leads to increased satisfaction and better adherence to treatment plans. Factor 2, "Patient Safety and Dietary Services", comprises five key elements: patient safety facilities, courteous meal service, food temperature, hospital orientation, and provision of preferred food options. This factor emphasizes the critical importance of ensuring patient safety and offering personalized dietary services, particularly for patients with extended hospital stays. Effective safety measures and tailored nutrition are essential for patient recovery and satisfaction, enhancing health outcomes and the overall hospital experience.[36,37] Factor 3, "Facility and Comfort Infrastructure", encompasses four key elements: relaxation spaces, parking facilities, noise management, and hospital amenities for patients. This factor highlights the importance of the hospital's physical environment in enhancing patient care. A comfortable, hygienic, and welcoming hospital environment plays a pivotal role in shaping patient experiences, particularly for hospital stays. Investing in facilities that prioritize comfort and cleanliness significantly impacts both the physical recovery and psychological well-being of patients.[38,39] Factor 4, "Comprehensive Patient Support Services", includes two primary elements: support for personal religious activities and promotion of emotional well-being. This factor adopts a holistic approach, addressing patients' clinical, emotional, and psychosocial needs comprehensively.[40,41] Services tailored to individual religious practices and therapeutic interventions, such as music and laughter therapy, demonstrate a commitment to the overall well-being of patients, promoting healing and comfort.[42,43]

Second, the CFA results validated the constructs, with excellent model fit indices. We compared various CFA models and found the 4-factors model to be the best fit. The second order model is a viable alternative but does not surpass the 4-factors model, while the unidimensional model is inadequate. Thus, we adopted the 4-factors model. Also, the IEMS showed strong convergent validity, with high CR and AVE values and significant correlations with the Patient Satisfaction Scale. Discriminant validity was confirmed by MSV values lower than AVE values, meeting the Fornell-Larcker criterion. All reliability measures, including Cronbach's alpha, split-half reliability, test-retest reliability, and McDonald's omega, exceeded 0.80, confirming the IEMS's reliability.

Unlike conventional tools, the IEMS considers the hospital environment, continuity of care, and emotional support, providing a more holistic view of patient experiences. This broad scope ensures that all critical elements of patient care are measured and addressed, leading to a more accurate and meaningful assessment. For example, while the Picker Patient Experience Questionnaire may overlook specific aspects like the cleanliness and comfort of hospital facilities, the IEMS includes detailed questions about the physical environment. Patients are asked about the adequacy of relaxation spaces, the cleanliness of their rooms, and the availability of quiet areas, which directly impact their comfort and overall experience during their stay.[44] Similarly, the CAHPS survey often misses the continuity of care that patients receive throughout their hospital stay. In contrast, the IEMS includes items that evaluate whether patients felt their care was well-coordinated among the various healthcare providers they interacted with.[45] Questions such as "Did you feel that your doctors, nurses, and other healthcare staff were all aware of your medical history and treatment plans?" help to ensure that the IEMS captures the seamless transition of care that is critical for patient satisfaction and health outcomes. Additionally, the IEMS places significant emphasis on emotional support, an area frequently neglected by other tools. For instance, it includes questions about the availability of emotional and psychological support services, such as access to counselors or support groups, and whether patients felt that their emotional needs were met by the healthcare staff. This aspect is crucial for understanding the full scope of patient experiences, as emotional well-being is a significant component of overall health and recovery.[43] These examples illustrate how the IEMS's comprehensive approach provides a more nuanced and complete picture of inpatients experiences, ensuring that all critical elements of patient care are measured and addressed.

Another distinctive feature of the IEMS is its psychometric validity, particularly in non-Western settings. Many existing instruments are primarily designed with Western healthcare systems in mind, often failing to capture the cultural nuances of patient experiences elsewhere. The IEMS bridges this gap by developing psychometric tools applicable across various cultural contexts, ensuring accurate and inclusive measurement of patient experiences. This was achieved through focus groups and interviews with patients and healthcare professionals during the development of the IEMS. Additionally, a two-phase Delphi survey with experts was utilized to refine the items further, combining quantitative ratings and qualitative feedback to ensure the final set of 20 items was relevant and clear. This iterative approach ensured both face and content validity of the scale, blending expert opinions with patient insights and resonating with the cultural nuances of the target population. Reflecting these characteristics, the IEMS includes culturally specific items, such as considerations for food temperature and the provision of preferred food options, acknowledging dietary preferences and cultural practices. This significantly enhances the overall hospital experience for patients. It also addresses the importance of noise management, reflecting the need for patients to stay with family caregivers. These features allow for the measurement of inpatients experiences within this cultural context.

In summary, the IEMS demonstrates significant strengths in assessing inpatients experiences within the South Korean healthcare context. Its comprehensive and culturally tailored design captures a broad range of patient experiences, providing valuable insights for improving patient care and satisfaction. While ongoing refinement and validation are necessary to maintain its relevance and reliability, the IEMS offers a robust tool for enhancing healthcare outcomes and ensuring that the healthcare system respects and integrates cultural values, leading to higher levels of patient satisfaction.

Limitations

In this study, cross-cultural validation was not considered. Future research should explore the applicability of the IEMS in non-Korean settings to ensure its relevance and accuracy across different cultural contexts. Additionally, an invariance analysis was not conducted to confirm the scale's robustness across different subgroups, which is crucial for verifying the measurement model's equivalence across various demographic and clinical groups. Future studies should address these Limitations by securing a larger and more diverse sample.

Conclusion

In Conclusion, our study demonstrates the robust validity and reliability of the IEMS within the South Korean healthcare context. The CFA results validated the constructs, with model fit indices indicating an excellent fit. The IEMS exhibited strong convergent validity, supported by high CR and AVE values for all factors, exceeding the recommended threshold of 0.50. Significant positive correlations between the IEMS and the Patient Satisfaction Scale further affirmed its convergent validity. The study also highlighted the IEMS's comprehensive and culturally sensitive approach, incorporating specific aspects like the hospital environment, continuity of care, and emotional support, which are often overlooked by traditional tools. These findings confirm the IEMS as a reliable and effective instrument for assessing inpatient experiences, ensuring a holistic and accurate measurement of patient care elements.

Institutional Review Board Statement

The study was conducted under the Declaration of Helsinki, and approved by the Institutional Review Board at Chonnam National University Hospital (IRB no. CNUH-2020-032).

Data Sharing Statement

The datasets generated and/or analyzed during the current study are not publicly available due to respondents' confidentiality but are available from the corresponding author on reasonable request.

Informed Consent Statement

Informed consent was obtained from all study participants before participation in this study. All participants were informed that no personal identifying information was collected.

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Author Contributions

All authors made a significant contribution to the work reported, whether in conception, study design, execution, data acquisition, analysis, and interpretation, or in all these areas; or drafting, revising, or critical review of the article. All authors approved the final version to be published, agreed on the journal for article submission, and agreed to be accountable for all aspects of the work.

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Disclosure

The authors declare no conflicts of interest in this work.

References

1. Jenkinson C, Coulter A, Bruster S, Richards N, Chandola T. Patients' experiences and satisfaction with health care: results of a questionnaire study of specific aspects of care. *Qual Saf Health Care*. 2002;11(4):335–339. doi:10.1136/qhc.11.4.335
2. Perera S, Dabney BW. Case management service quality and patient-centered care. *J Health Organ Manag*. 2020;34(5):551–568. PMID: 32584524. doi:10.1108/JHOM-12-2019-0347
3. Berry LL. Service innovation is urgent in healthcare. *AMS Rev*. 2019;9:78–92. doi:10.1007/s13162-019-00135-x
4. Sorensen K, Van den Broucke S, Fullam J, et al. Health literacy and public health: a systematic review and integration of definitions and models. *BMC Public Health*. 2013;12:80. doi:10.1186/1471-2458-12-80

5. Shale S. Patient experience as an indicator of clinical quality in emergency care. *Clin Gov*. 2013;18(4):285–292. doi:10.1108/CGIJ-03-2012-0008
6. Wolf JA, Niederhauser V, Marshburn D, LaVela SL. Defining patient experience. *Patient Exp J*. 2014;1(1):7–19. doi:10.35680/2372-0247.1004
7. Ahmed F, Burt J, Roland M. Measuring patient experience: concepts and methods. *Patient-Patient-Centered Outcomes Res*. 2014;7:235–241. doi:10.1007/s40271-014-0060-5
8. Bellio E, Buccoliero L. Main factors affecting perceived quality in healthcare: a patient perspective approach. *TQM J*. 2021;33(7):176–192. doi:10.1108/TQM-11-2020-0274
9. Doyle C, Lennox L, Bell D. A systematic review of evidence on the links between patient experience and clinical safety and effectiveness. *BMJ Open*. 2013;3(1):e001570. doi:10.1136/bmjopen-2012-001570
10. Jenkinson C, Coulter A, Bruster S. The Picker patient experience questionnaire: development and validation using data from in-patient surveys in five countries. *Int J Qual Health Care*. 2002;14:353–358. doi:10.1093/intqhc/14.5.353
11. Dyer N, Sorra JS, Smith SA, Cleary PD, Hays RD. Psychometric properties of the consumer assessment of healthcare providers and systems (CAHPS®) clinician and group adult visit survey. *Med Care*. 2012;50:S28–34. doi:10.1097/MLR.0b013e31826cbc0d
12. Oben P. Understanding the patient experience: a conceptual framework. *J Patient Exp*. 2020;7(6):906–910. doi:10.1177/2374373520951672
13. Wong EL, Coulter A, Cheung AW, Yam CH, Yeoh EK, Griffiths S. Validation of inpatient experience questionnaire. *Int J Qual Health Care*. 2013;25(4):443–451. doi:10.1093/intqhc/mzt034
14. Lee H. Rise of the social?: socialization of care and gendered social economy in South Korea. *Asian J Soc Sci*. 2023;51(2):80–86. doi:10.1016/j.ajss.2022.09.003
15. Seo S. Introduction of patient experience assessment to measure patient-centeredness. *HIRA Policy Trend*. 2017;11(3):25–28.
16. Kim YJ, Lee G, Choi S. Validation of the Korean version of patient-centered care tool: for outpatients. *Patient Prefer Adherence*. 2023;1525–1540. doi:10.2147/PPA.S411109
17. Yi K, Kim S. Patient perspectives of chronic disease management and unmet care needs in South Korea: a qualitative study. *J Patient Exp*. 2023;10:23743735231213766. doi:10.1177/23743735231213766
18. Clark LA, Watson D. Constructing validity: new developments in creating objective measuring instruments. *Psychol Assess*. 2019;31(12):1412–1427. doi:10.1037/pas0000626
19. DeVellis RF. Scale development: theory and applications. *J Int Acad Res*. 2003;10(2):23–41.
20. MacKenzie SB, Podsakoff PM, Podsakoff NP. Construct measurement and validation procedures in MIS and behavioral research: integrating new and existing techniques. *MIS Q*. 2011;35(2):293–334. doi:10.2307/23044045
21. Lawshe CH. A quantitative approach to content validity. *Pers Psychol*. 1975;28(4):563–575. doi:10.1111/j.1744-6570.1975.tb01393.x
22. Gilbert GE, Prion S. Making sense of methods and measurement: lawshe's content validity index. *Clin Simul Nurs*. 2016;12(12):530–531. doi:10.1016/j.ecns.2016.08.002
23. Nunnally JC. *Psychometric Theory*. 2nd ed. New York (NY): McGraw-Hill; 1978:330–430.
24. Yoon SJ, Yu SH, Kim YH, Lee JJ. A study for the factors on choosing hospitals and patients satisfaction between geriatric hospitals and general hospitals. *Korean J Hosp Manag*. 2004;9(2):31–70.
25. Schreiber JB. Issues and recommendations for exploratory factor analysis and principal component analysis. *Res Soc Adm Pharm*. 2021;17(5):1004–1011. doi:10.1016/j.sapharm.2020.07.027
26. Fornell C, Larcker DF. Evaluating structural equation models with unobservable variables and measurement error. *J Mark Res*. 1981;18(1):39–50. doi:10.1177/002224378101800104
27. Streiner DL, Norman GR, Cairney J. *Health Measurement Scales: A Practical Guide to Their Development and Use*. Oxford University Press; 2015.
28. Hair JF, Black WC, Babin BJ, Anderson RE. *Multivariate Data Analysis: A Global Perspective*. 7th ed. Upper Saddle River (NJ): Pearson Prentice Hall; 2010:109–136.
29. Bagozzi RP, Yi Y. On the evaluation of structural equation models. *J Acad Marking Sci*. 1988;16:74–94. doi:10.1007/BF02723327
30. Salisbury C, Wallace M, Montgomery AA. Patients' experience and satisfaction in primary care: secondary analysis using multilevel modelling. *BMJ*. 2010;341:c5004. doi:10.1136/bmj.c5004
31. Bleich SN, Özaltin E, Murray CJ. How does satisfaction with the health-care system relate to patient experience? *Bull World Health Organ*. 2009;87(4):271–278. doi:10.2471/BLT.07.050401
32. Hayes AF, Coutts JJ. Use omega rather than Cronbach's alpha for estimating reliability But… Commun. *Methods Meas*. 2020;14(1):1–24. doi:10.1080/19312458.2020.1718629
33. Eisinga R, Grotenhuis MT, Pelzer B. The reliability of a two-item scale: Pearson, cronbach, or spearman-brown? *Int J Public Health*. 2013;58:637–642. doi:10.1007/s00038-012-0416-3
34. Yeh MY, Wu SC, Tung TH. The relation between patient education, patient empowerment and patient satisfaction: a cross-sectional-comparison study. *Appl Nurs Res*. 2018;39:11–17. doi:10.1016/j.apnr.2017.10.008
35. Desborough J, Phillips C, Mills J, Korda R, Bagheri N, Banfield M. Developing a positive patient experience with nurses in general practice: an integrated model of patient satisfaction and enablement. *J Adv Nurs*. 2018;74(3):564–578. doi:10.1111/jan.13461
36. Dall'Oglio I, Nicolò R, Di Ciommo V, et al. A systematic review of hospital foodservice patient satisfaction studies. *J Acad Nutr Diet*. 2015;115(4):567–584. doi:10.1016/j.jand.2014.11.013
37. Amankwah O, Choong WW, Mohammed AH. Modelling the influence of healthcare facilities management service quality on patients satisfaction. *J Facil Manag*. 2019;17(3):267–283. doi:10.1108/JFM-08-2018-0053
38. Reiling J. Facility design focused on patient safety. *Front Health Serv Manag*. 2004;21(1):41–46. doi:10.1097/01974520-200407000-00006
39. Sheehan-Smith L. Key facilitators and best practices of hotel-style room service in hospitals. *J Am Diet Assoc*. 2006;106(4):581–586. doi:10.1016/j.jada.2006.01.002
40. Amankwah O, Choong WW, Boakye-Agyeman NA. Patients satisfaction of core health-care business: the mediating effect of the quality of health-care infrastructure and equipment. *J Facil Manag*. 2022. doi:10.1108/JFM-12-2021-0154
41. Timmermann C, Uhrenfeldt L, Birkelund R. Room for caring: patients' experiences of well-being, relief and hope during serious illness. *Scand J Caring Sci*. 2015;29(3):426–434. doi:10.1111/scs.12145

42. Alzahrani N. The effect of hospitalization on patients' emotional and psychological well-being among adult patients: an integrative review. *Appl Nurs Res*. 2021;61:151488. doi:10.1016/j.apnr.2021.151488
43. Schmid W, Rosland JH, von Hofacker S, Hunskår I, Bruvik F. Patient's and health care provider's perspectives on music therapy in palliative care–an integrative review. *BMC Palliat Care*. 2018;17:1–9. doi:10.1186/s12904-018-0286-4
44. Schweitzer M, Gilpin L, Frampton S. Healing spaces: elements of environmental design that make an impact on health. *J Altern Complement Med*. 2004;10:s71–83. doi:10.1089/acm.2004.10.S-71
45. Kwame A, Petrucka PM. A literature-based study of patient-centered care and communication in nurse-patient interactions: barriers, facilitators, and the way forward. *BMC Nursing*. 2021;20(1):158. doi:10.1186/s12912-021-00684-2