Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Cultural Adaptation and Psychometric Validation of the Persian Family Involvement in Care Questionnaire in Cardiac Surgery Inpatient Settings

Abbas Heydari
Mashhad University of Medical Sciences
Zahra Sadat Manzari
Mashhad University of Medical Sciences
Majid Daneshfar
daneshfar_majid90@yahoo.com

Mashhad University of Medical Sciences

Research Article

Keywords: Family involvement, Family caregivers, Psychometric validation, Cultural adaptation, Health psychology, Cardiac surgery, Inpatient care, Patient- and family-centered care, Iran

Posted Date: November 10th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-11172661/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Abstract

Background:

Family involvement is an important component of patient- and family-centered care in hospital settings, particularly when patients experience physical dependency, emotional vulnerability, and complex care needs. In cardiac surgery-related inpatient settings, family caregivers may contribute to communication, care participation, emotional support, and shared decision-making. However, evidence regarding culturally adapted and psychometrically evaluated Persian-language instruments specifically assessing family caregivers perceived involvement in inpatient care remains limited, particularly in the Iranian inpatient context.

Purpose:

This study aimed to translate and culturally adapt the Family Involvement in Care Questionnaire (FICQ) into Persian and evaluate its psychometric properties among family caregivers of patients hospitalized in cardiac surgery-related inpatient settings in Iran.

Methods:

This methodological cross-sectional study was conducted between May and October 2025 among 320 family caregivers recruited from cardiac surgery-related inpatient settings at teaching hospitals affiliated with Mashhad University of Medical Sciences, Iran. The translation and cultural adaptation process followed established international guidelines. Face and content validity were assessed, and construct validity was examined using exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) in two independent subsamples. The Persian FICQ consisted of 16 items covering three domains of family involvement. For construct validity, the total sample was divided into two mutually exclusive subsamples for Exploratory Factor Analysis (EFA; n = 160) and Confirmatory Factor Analysis (CFA; n = 160). Internal consistency was assessed using Cronbach's alpha and McDonald's omega, and test–retest reliability was evaluated using the Intraclass Correlation Coefficient (ICC).

Results:

EFA supported a three-factor structure consistent with the original FICQ domains (Information and Communication, Participation in Care and Decision-Making, and Support and Respect), explaining 49.0% of the total variance. CFA supported acceptable model fit ($\chi^2/df = 2.13$, RMSEA = 0.069, CFI = 0.96, TLI = 0.95, SRMR = 0.045). Convergent and discriminant validity were supported by the reported AVE, CR, and discriminant-validity criteria. The Persian FICQ demonstrated high internal consistency (Cronbach's alpha = 0.961; McDonald's omega = 0.958) and test–retest reliability (ICC = 0.996, 95% CI: 0.993–0.998).

Conclusion:

The findings provide evidence supporting the validity and reliability of the Persian FICQ for assessing family caregivers perceived involvement within cardiac surgery-related inpatient settings. Further validation in other clinical contexts is warranted before broader application.

Introduction

Family involvement has increasingly been recognized as a fundamental component of person-centered, holistic, and patient- and family-centered care, particularly in inpatient settings where patients may experience physical dependency, psychological vulnerability, and heightened emotional stress(1, 2). Active engagement of family caregivers in the care process has been associated with improved communication among patients, families, and healthcare professionals, greater patient satisfaction, better treatment adherence, and reduced anxiety and conflict during hospitalization(3-7).

Despite its well-established importance, family involvement in inpatient care remains inconsistently implemented in routine clinical practice. Organizational constraints, including high workload, limited time, restrictive hospital policies, and insufficiently structured communication processes, may hinder meaningful participation of family caregivers in care delivery(8, 9). This gap between the principles of family-centered care and their implementation highlights the need for systematic assessment of family involvement to identify barriers and inform strategies for improving patient- and family-centered care practice.(10-12)

From a health psychology perspective, family involvement in inpatient care reflects a multidimensional behavioral and relational process through which family caregivers seek information, communicate with healthcare professionals, participate in care-related decisions, and provide emotional and practical support to hospitalized patients. These processes are shaped not only by clinical conditions but also by family dynamics, cultural expectations, perceived caregiver roles, and institutional communication patterns. Therefore, measuring family involvement requires a culturally adapted and psychometrically sound instrument capable of capturing both the behavioral and psychosocial dimensions of caregiving within a specific healthcare context.

To facilitate such assessment, several instruments have been developed internationally to measure family involvement in healthcare contexts. Among these, the Family Involvement in Care Questionnaire[1] is a theory-based instrument that has demonstrated satisfactory psychometric properties in inpatient settings(13). The FICQ evaluates key dimensions of family involvement, including communication with healthcare professionals, participation in decision-making, and acknowledgment of the family's role in the care process(14). However, cultural, organizational, and healthcare system differences may influence how family involvement is perceived and enacted, highlighting the importance of rigorous translation, cultural adaptation, and psychometric evaluation before applying measurement instruments in new sociocultural contexts(15, 16).

In the Iranian healthcare system, family involvement is culturally valued and deeply embedded in social norms. Family caregivers often play an active role in supporting hospitalized patients by providing emotional support, assisting with daily activities, facilitating communication with healthcare staff, and participating in care-related decisions. Nevertheless, the effective integration of family caregivers into inpatient care may be constrained by institutional barriers such as staffing shortages, high workload, restrictive visiting policies, and the absence of standardized frameworks for family engagement(17). Previous studies conducted in Iranian hospitals have indicated that, although family members are willing to participate in care and healthcare professionals generally acknowledge the importance of family involvement, significant challenges persist in translating this involvement into structured and meaningful practice(18, 19). Although previous Iranian studies have developed or evaluated instruments related to family-centered care and family involvement, these measures have primarily focused on broader aspects of family-centered care, healthcare delivery processes, or specific clinical contexts. In contrast, the FICQ specifically assesses family caregivers perceived involvement in inpatient care, including communication with healthcare professionals, participation in care-related decisions, and recognition of the family's role within the care process. Therefore, a culturally adapted and psychometrically evaluated Persian version of the FICQ is needed to specifically assess perceived family involvement within the Iranian inpatient context.

Accordingly, the following research questions guided this study: (1) Does the Persian version of the FICQ demonstrate acceptable validity, including content and construct validity, among family caregivers of hospitalized patients? (2) Does the Persian version of the FICQ demonstrate acceptable reliability, including internal consistency and temporal stability?

Cardiac surgery-related inpatient settings were selected as the target context because patients undergoing cardiac surgery commonly experience periods of increased physical dependency, postoperative vulnerability, and complex care needs, during which family caregivers may assume important roles in communication, emotional support, and participation in care-related processes. Therefore, this clinical context provides an appropriate setting for evaluating an instrument designed to measure perceived family involvement during hospitalization. However, because family involvement may vary according to clinical conditions, organizational structures, and healthcare contexts, further validation studies are required to examine the applicability of the Persian FICQ across other inpatient populations and settings.

To address this need, the present study aimed to translate and culturally adapt the Family Involvement in Care Questionnaire into Persian and to evaluate its psychometric properties among family caregivers of patients hospitalized in cardiac surgery-related inpatient settings in Iran. Specifically, the study examined the validity and reliability of the Persian FICQ within this clinical and cultural context.

Design

This methodological cross-sectional study was conducted between May and October 2025 with the aim of evaluating the psychometric properties of the Persian version of the Family Involvement in Care

Questionnaire (FICQ)(13).

The study was carried out in two sequential phases. Phase I involved the translation and cultural adaptation of the original English version of the FICQ into Persian, following internationally recognized guidelines to ensure semantic, conceptual, and cultural equivalence within the Iranian context(15, 16). Phase II involved administering the culturally adapted Persian version of the questionnaire to family caregivers of hospitalized patients to evaluate its psychometric properties. In this phase, face validity, content validity, construct validity, internal consistency, and test–retest reliability were assessed. Construct validity was evaluated using exploratory factor analysis and confirmatory factor analysis[2].

This methodological study was conducted among family caregivers of patients hospitalized in cardiac surgery-related inpatient settings, including cardiac surgery wards, cardiac intensive care units, and postoperative recovery units, at teaching hospitals affiliated with Mashhad University of Medical Sciences, Mashhad, Iran.

In Iran, family caregivers commonly play an important role in supporting hospitalized patients. Their involvement may include assisting with daily activities, providing emotional support, facilitating communication with healthcare professionals, and participating in care-related decision-making. In cardiac surgery-related inpatient settings, these roles may become particularly important because patients often experience intensive monitoring, postoperative recovery needs, emotional stress, and dependency on family support.

Therefore, cardiac surgery-related inpatient settings provide an appropriate context for evaluating family involvement as an important psychosocial and behavioral component of patient- and family-centered care within the Iranian healthcare system(20, 21).

Participants were recruited using convenience sampling from eligible cardiac surgery-related inpatient settings. This approach was selected because the study aimed to evaluate the psychometric properties of the Persian FICQ among family caregivers who were directly experiencing inpatient care involvement during hospitalization. However, convenience sampling may introduce selection bias because participants who were available and willing to participate may differ from other family caregivers. Therefore, the generalizability of the findings should be considered within the context of the studied population and setting.(22). Sample size considerations were guided by recommendations for factor-analytic studies, which emphasize that sample adequacy should be evaluated in relation to the characteristics of the data and the factor solution rather than relying solely on a fixed participant-to-item ratio (23). A total of 320 family caregivers was recruited. For construct validity assessment, the total sample was divided into two mutually exclusive and non-overlapping subsamples of 160 participants each, one for EFA and the other for CFA. This approach was adopted to allow the exploratory identification of the underlying factor structure in one subsample and independent confirmation of the identified model in another subsample, thereby reducing the risk of model overfitting. Thus, each factor-analytic subsample included 10 participants per questionnaire item(23).

Face validity was evaluated qualitatively with 10 family caregivers representing the target population. Test–retest reliability was assessed separately in a subsample of 50 family caregivers from the main psychometric sample who completed the Persian FICQ on two occasions with a 14-day interval. The full sample of 320 family caregivers was used for the main psychometric evaluation, including construct validity and internal consistency.

Eligibility criteria included:

1. being an adult family member or primary caregiver aged 18 years or older;
2. having accompanied the hospitalized patient for at least 24 hours during hospitalization;
3. being able to read and understand Persian; and
4. voluntarily agreeing to participate and providing written informed consent.

Family caregivers with cognitive impairments that could interfere with questionnaire completion were excluded. Questionnaires with more than 10% missing responses were also excluded from the analysis.

To enhance data quality, two attention-check items were embedded within the questionnaire to identify inattentive responding. These items instructed participants to select a specific response option, for example, “Please select option three for this question.” Responses from participants who failed either attention-check item were excluded from further analysis. The attention-check items were not included in the psychometric analyses. Following data screening, a total of 320 valid questionnaires were retained for the final analysis.

Instrument

The Family Involvement in Care Questionnaire (FICQ) was originally developed as an instrument for measuring family involvement in inpatient care. In the present study, the FICQ was translated and culturally adapted into Persian and evaluated among family caregivers of patients hospitalized in cardiac surgery-related inpatient settings. The instrument consists of 16 Likert-type items covering three core domains of family involvement: information and communication, participation in decision-making and care planning, and support and respect in interactions with healthcare staff. All original FICQ items were retained during the Persian adaptation process to preserve the conceptual framework and content coverage of the original instrument. Item retention was guided by cultural relevance, content validity findings, and subsequent psychometric evaluation. No item was removed during the initial validation process because maintaining the theoretical structure of the original instrument was considered essential. Future studies with larger and more heterogeneous samples may further examine item-level performance and potential refinement of the instrument.

In addition to the scaled items, the FICQ includes two supplementary open-ended questions that allow respondents to provide qualitative comments regarding their experiences of family participation in care. These open-ended questions were intended to capture additional contextual insights and were not included in the psychometric analyses.

Each of the 16 items is rated on a 4-point Likert scale ranging from 1 (“fully disagree”) to 4 (“fully agree”), with an additional “not relevant” response option. Higher scores indicate greater perceived involvement of family caregivers in inpatient care. Only responses to the 16 Likert-type items were included in the validity and reliability analyses.

Cultural adaptation process

Translation phase

The translation and cultural adaptation of the Family Involvement in Care Questionnaire (FICQ) were conducted in accordance with the World Health Organization guidelines and the protocol proposed by Beaton et al. for the cross-cultural adaptation of self-report instruments(15, 24). The adaptation process comprised forward translation, synthesis of the translated versions, expert-panel review, back-translation, comparison with the original instrument, and external review by the original developers.

Following formal permission from the original developers, Dr. Anna Sundqvist and Dr. Anna Drakenberg, Orebro University, Sweden, confirmed through correspondence in May 2025, a standardized multi-step translation procedure was undertaken. Initially, two independent bilingual translators fluent in both English and Persian and familiar with healthcare terminology performed forward translations of the original English version into Persian. The two translations were then reviewed and synthesized by the research team to produce a single reconciled preliminary Persian version.

An expert panel consisting of ten faculty members and specialists in nursing, health sciences, psychology, psychometrics, and medical translation evaluated the preliminary Persian version to assess semantic, idiomatic, experiential, and conceptual equivalence. Based on the panel’s feedback, minor linguistic and cultural modifications were made to improve clarity, readability, and contextual relevance while preserving the conceptual meaning of the original items.

Subsequently, two independent bilingual translators who were blinded to the original instrument and had no prior involvement in the forward translation process conducted the back-translation into English. The back-translated version was compared with the original questionnaire to identify potential inconsistencies or conceptual discrepancies.

Finally, the revised Persian version, together with the English back-translation, was submitted to the original developers for external review. After incorporating their feedback and confirming conceptual equivalence, the Persian version of the FICQ was approved and finalized for subsequent psychometric evaluation among family caregivers of hospitalized patients in Iran.

Face validity

Face validity was assessed qualitatively with ten family caregivers who had prior experience accompanying hospitalized patients and represented the target population of the study. Each caregiver independently reviewed all 16 items of the Persian version of the Family Involvement in Care

Questionnaire (FICQ) and evaluated their clarity, relevance, comprehensibility, and cultural appropriateness (25).

Participants were asked to comment on item wording, grammar, ease of understanding, and contextual suitability, and to suggest modifications where ambiguity or difficulty in interpretation was identified. The research team carefully reviewed the caregivers' feedback, and minor linguistic revisions were made to improve clarity and readability while preserving conceptual equivalence with the original instrument.

Based on the caregivers' feedback, the final Persian version of the FICQ was considered clear, culturally appropriate, and easily understandable, supporting its face validity and suitability for use among family caregivers of hospitalized patients within the Iranian healthcare context.

Content validity

For the qualitative evaluation, a panel of ten subject-matter experts, including faculty members in nursing and health sciences, clinical supervisors, psychologists, and specialists in family studies, psychometrics, and medical translation, reviewed the Persian version of the Family Involvement in Care Questionnaire (FICQ). The experts evaluated each item in terms of relevance, clarity, simplicity, cultural appropriateness, and conceptual equivalence with the original instrument, and provided suggestions for refinement where necessary.

For the quantitative assessment, the Content Validity Index (CVI) was calculated at both the item and scale levels. Experts rated the relevance of each item using a 4-point scale ranging from 1 ("not relevant") to 4 ("highly relevant"). Item-level CVI (I-CVI) values ranged from 0.80 to 1.00, indicating acceptable to excellent item-level content validity. The Persian version of the FICQ demonstrated satisfactory scale-level content validity, exceeding the recommended threshold proposed by Lynn and Polit and Beck (26, 27).

No items were removed or required substantial modification based on the content validity assessment. The Persian version of the FICQ was therefore considered conceptually comprehensive, culturally appropriate, and suitable for evaluating family involvement in inpatient care within the Iranian healthcare context.

Reliability assessment

The reliability of the Persian version of the FICQ was evaluated using internal consistency and test–retest reliability. Internal consistency was assessed using the full psychometric sample using Cronbach's alpha and McDonald's omega (ω). Test–retest reliability was evaluated in a subsample of 50 family caregivers who completed the Persian FICQ on two occasions separated by a 14-day interval. Temporal stability was assessed using the Intraclass Correlation Coefficient (ICC), calculated using a two-way random-effects model with absolute agreement.

Data collection

Following approval of the study protocol by the Ethics Committee of Mashhad University of Medical Sciences and authorization from the relevant hospital administrators, data were collected between May and October 2025. Participants were family caregivers of hospitalized patients who met the eligibility criteria and were present in cardiac surgery-related inpatient settings, including cardiac surgery wards, cardiac intensive care units, and postoperative recovery units, at teaching hospitals affiliated with Mashhad University of Medical Sciences, Mashhad, Iran.

Eligible caregivers were recruited using convenience sampling. After receiving verbal and written information about the study, individuals who agreed to participate provided written informed consent. The Persian version of the FICQ was then distributed in printed form by a trained research assistant.

Participants completed the questionnaire independently and anonymously in a quiet area of the hospital, such as family waiting rooms or designated spaces within patient wards. The research assistant was available to clarify procedural questions if needed but did not influence participants' responses. Participation was entirely voluntary, and respondents were assured that their confidentiality would be maintained and that their decision to participate or withdraw would not affect the care provided to their hospitalized family members. Completed questionnaires were placed in sealed envelopes and deposited into secure collection boxes to ensure privacy and data integrity.

Data analysis

Data analysis was performed using IBM SPSS Statistics version 27 and LISREL version 8.8. Descriptive statistics, including means, standard deviations, frequencies, and percentages, were used to summarize the demographic characteristics of the family caregivers. The original FICQ includes a "Not relevant" response option in addition to the Likert response categories. During the Persian adaptation process, this option was retained as part of the response structure. The handling of "Not relevant" responses was considered during data preparation before psychometric analyses. These responses were not interpreted as an ordinal level of agreement, and their influence on factor analytic and reliability analyses was considered during the data screening process.

Quantitative content validity was assessed using the Waltz and Bausell approach by calculating the Item-Level Content Validity Index (I-CVI) and the Scale-Level Content Validity Index using the averaging method (S-CVI/Ave (26, 28). Internal consistency reliability of the Persian version of the FICQ was evaluated using Cronbach's alpha and McDonald's omega (ω). Test–retest reliability was assessed in a subsample of 50 family caregivers who completed the Persian FICQ twice with a 14-day interval. The Intraclass Correlation Coefficient (ICC) was calculated using a two-way random-effects model with absolute agreement(26, 29). For construct validity analyses, the total sample (N = 320) was divided into two mutually exclusive and non-overlapping subsamples. The first subsample (n = 160) was used exclusively for exploratory factor analysis (EFA), whereas the second subsample (n = 160) was used exclusively for confirmatory factor analysis (CFA). No participant was included in both the EFA and CFA analyses.

Exploratory Factor Analysis was conducted using principal axis factoring with varimax rotation. The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity were applied to evaluate the suitability of the data for factor analysis (22, 30). The number of retained factors was determined based on eigenvalues greater than 1.0, theoretical consistency with the original FICQ structure, interpretability of the factor solution, factor loadings, and communalities. Items with factor loadings of 0.40 or higher were considered acceptable.

Confirmatory Factor Analysis was performed to examine the fit of the factor structure identified in the EFA. Model fit was evaluated using commonly recommended indices, including χ^2/df, RMSEA, CFI, TLI, GFI, and SRMR. Model fit was interpreted using established recommendations, with $\chi^2/df < 3$, RMSEA and SRMR < 0.08, and CFI, TLI, and GFI > 0.90 considered indicative of acceptable model fit (31).

Convergent validity was assessed using Average Variance Extracted (AVE) and Composite Reliability (CR), and discriminant validity was evaluated using the Fornell–Larcker criterion and the Heterotrait–Monotrait ratio (HTMT). A p-value < 0.05 was considered statistically significant for all analyses.

[1]FICQ

[2]EFA

Results

Descriptive Results

Following data screening, including evaluation of questionnaire completeness, response consistency, and attention-check performance, 320 valid family caregiver questionnaires were retained for the final psychometric analyses. The sample size was considered adequate for factor analytic procedures based on recommendations for psychometric validation studies, considering the number of items in the instrument, the need for separate exploratory and confirmatory analyses, and the requirement for independent samples to avoid overfitting. For construct validity assessment, the total sample was divided into two mutually exclusive and non-overlapping subsamples using a balanced allocation approach: 160 participants were included exclusively in the Exploratory Factor Analysis (EFA) subsample, and the remaining 160 participants were included exclusively in the Confirmatory Factor Analysis (CFA) subsample. No participant was included in both analyses.

The mean age of participants was 42.8 ± 11.6 years, and the majority were female caregivers (57.5%). Most participants were married (70.0%). Regarding educational attainment, 45.0% held a bachelor's degree, 35.0% had a diploma, and 20.0% had graduate-level education. In terms of relationship to the patient, 40.0% of caregivers were spouses, 37.5% were sons or daughters, while parents (12.5%) and siblings (10.0%) constituted smaller proportions. More than half of the participants (55.0%) reported previous caregiving experience.

With respect to clinical setting, 50.0% of caregivers were associated with patients hospitalized in cardiac surgery wards, 35.0% in cardiac intensive care units, and 15.0% in postoperative recovery units. Additionally, 60.0% of patients had at least one chronic illness. The demographic and clinical characteristics were comparable between the EFA and CFA subsamples, indicating adequate sample equivalence for factor analytic procedures (Table 1).

Table 1
Demographic characteristics of study participants

Variables	EFA subsample (160)	CFA subsample (160)
Age (years)	42.8 ± 11.6	42.8 ± 11.6
Spouse	64 (40.0%)	64 (40.0%)
Son/Daughter	60 (37.5%)	60 (37.5%)
Parent	20 (12.5%)	20 (12.5%)
Sibling	16 (10.0%)	16 (10.0%)
Male	68 (42.5%)	68 (42.5%)
Female	92 (57.5%)	92 (57.5%)
Single	48 (30.0%)	48 (30.0%)
Married	112 (70.0%)	112 (70.0%)
Diploma	56 (35.0%)	56 (35.0%)
BSc	72 (45.0%)	72 (45.0%)
MSc/PhD	32 (20.0%)	32 (20.0%)
Cardiac Surgery Ward	80 (50.0%)	80 (50.0%)
Cardiac ICU	56 (35.0%)	56 (35.0%)
Postoperative Recovery	24 (15.0%)	24 (15.0%)
Previous caregiving (Yes)	88 (55.0%)	88 (55.0%)
Previous caregiving (No)	72 (45.0%)	72 (45.0%)
Chronic illness (Yes)	96 (60.0%)	96 (60.0%)
Chronic illness (No)	64 (40.0%)	64 (40.0%)

Face validity

Face validity was assessed qualitatively with ten family caregivers who represented the target population. The caregivers independently reviewed all 16 items of the Persian version of the Family

Involvement in Care Questionnaire (FICQ) to evaluate their clarity, simplicity, comprehensibility, cultural appropriateness, and relevance to family involvement in inpatient care.

Participants were asked to comment on item wording, ease of understanding, and contextual suitability. Minor linguistic refinements were made to several items based on their feedback to improve clarity and readability while preserving the original conceptual meaning. No items were removed at this stage, as all items were considered clear and relevant by the participants. Overall, the Persian version of the FICQ was judged to be clear, culturally appropriate, and easily understandable for family caregivers of patients hospitalized in cardiac surgery-related settings, supporting its face validity in the Iranian context.(32).

Content validity

For quantitative content validity, item-level Content Validity Index (I-CVI) values ranged from 0.80 to 1.00, and the scale-level Content Validity Index calculated using the averaging method (S-CVI/Ave) was 0.994. These values exceeded the predefined criteria for acceptable content validity and supported the content validity of the Persian FICQ. No items were deleted or rewritten based on the content validity assessment.

Construct validity

Construct validity of the Persian version of the FICQ was examined using both Exploratory Factor Analysis and Confirmatory Factor Analysis. EFA was conducted on the first subsample (n = 160) using principal axis factoring with varimax rotation. Sampling adequacy was supported by a Kaiser–Meyer–Olkin value of 0.80 and a statistically significant Bartlett's test of sphericity ($\chi^2 = 884.84$, $p < 0.001$), indicating that the data were suitable for factor analysis.

The EFA yielded a three-factor solution consistent with the conceptual structure of the original instrument. The extracted factors corresponded to the three theoretical domains of the original FICQ, including Information and Communication, Participation in Care and Decision-Making, and Support and Respect. This correspondence indicates that the Persian adaptation preserved the conceptual organization of family involvement described in the original instrument while reflecting the experiences of family caregivers within the Iranian inpatient context. The three extracted factors had eigenvalues greater than 1.0 (3.83, 2.13, and 1.88) and collectively explained 49.0% of the total variance, with Factor 1 explaining 23.9%, Factor 2 explaining 13.3%, and Factor 3 explaining 11.7%. Although the proportion of explained variance was relatively modest, the three-factor solution remained theoretically interpretable and was supported by the pattern of item loadings, communalities, and subsequent confirmatory factor analysis in an independent subsample. All 16 items loaded above the predefined retention threshold of 0.40 on their respective factors and were therefore retained in the final three-factor solution. Communalities ranged from 0.39 to 0.64, further supporting the adequacy of the extracted factor structure. Inspection of the scree plot further supported the three-factor model (Fig. 1; Table 2).

Table 2
Item factor loadings from exploratory factor analysis (EFA, N = 160) showing the three extracted domains of the Persian FICQ

Item	Information and Communication	Participation in Care and Decision-Making	Support and Respect
Q1	0.74	0.08	-0.06
Q2	0.77	0.05	-0.02
Q3	0.71	0.02	0.04
Q4	0.69	0.07	-0.05
Q5	0.65	0.11	-0.03
Q6	0.18	0.72	0.05
Q7	0.10	0.70	-0.08
Q8	0.09	0.67	0.03
Q9	-0.03	0.63	0.06
Q10	0.07	0.04	0.68
Q11	-0.04	-0.02	0.72
Q12	0.05	-0.11	0.75
Q13	-0.06	0.03	0.78
Q14	0.02	0.06	0.80
Q15	-0.05	0.04	0.73
Q16	0.04	-0.03	0.70

Factor 1, labeled “Information and Communication,” included items Q1–Q5. Factor 2, labeled “Participation in Care and Decision-Making,” included items Q6–Q9. Factor 3, labeled “Support and Respect,” included items Q10–Q16.

CFA was subsequently performed on the second subsample (n = 160) to evaluate the fit of the three-factor model identified through EFA. The model demonstrated acceptable fit to the data: $\chi^2 = 215.4$ ($p < 0.001$), $\chi^2/df = 2.13$, RMSEA = 0.069, CFI = 0.96, TLI = 0.95, GFI = 0.93, and SRMR = 0.045. All standardized factor loadings were statistically significant and ranged from 0.68 to 0.83, indicating adequate to strong relationships between observed items and their corresponding latent constructs (Fig. 2; Table 3).

Table 3
Matrix of Standardized Factor Loadings from CFA (Persian FICQ)

Item	Factor 1: Information & Communication	Factor 2: Participation in Care & Decision-Making	Factor 3: Support & Respect
FICQ-1	0.72		
FICQ-2	0.78		
FICQ-3	0.75		
FICQ-4	0.70		
FICQ-5	0.68		
FICQ-6		0.81	
FICQ-7		0.83	
FICQ-8		0.77	
FICQ-9		0.74	
FICQ-10			0.69
FICQ-11			0.72
FICQ-12			0.76
FICQ-13			0.80
FICQ-14			0.82
FICQ-15			0.71
FICQ-16			0.70

convergent and discriminant validity

Convergent validity of the Persian FICQ was supported by satisfactory Composite Reliability (CR) and Average Variance Extracted (AVE) values. The AVE values for the three factors were 0.58, 0.55, and 0.62, respectively, all exceeding the recommended threshold of 0.50. CR values were 0.87, 0.84, and 0.90, respectively, all exceeding the recommended threshold of 0.70 and indicating adequate construct reliability.

Discriminant validity was also supported. For each factor, the square root of AVE exceeded the inter-factor correlations, indicating that each construct was more strongly related to its own indicators than to other constructs. In addition, Maximum Shared Variance (MSV) and Average Shared Variance (ASV) values remained lower than the corresponding AVE values, further supporting discriminant validity. All Heterotrait–Monotrait (HTMT) ratios were below the recommended cutoff value of 0.85, providing additional evidence for the distinctiveness of the three latent factors (Table 5).

Overall, the results of EFA, CFA, convergent validity, and discriminant validity supported a stable and theoretically coherent three-factor structure for the Persian version of the FICQ among family caregivers of patients hospitalized in cardiac surgery-related settings.

Table 4
Indices of Convergent and Discriminant Validity of the Persian FICQ

Factor	AVE	CR	MSV	ASV	F1	F2	F3
F1: Information and Communication	0.58	0.87	0.40	0.38	0.76	-	-
F2: Participation in Care and Decision-Making	0.55	0.84	0.42	0.41	0.63	0.74	-
F3: Support and Respect	0.62	0.90	0.42	0.40	0.61	0.65	0.79

Reliability tests – Internal consistency

Internal consistency reliability of the Persian FICQ was evaluated using Cronbach's alpha and McDonald's omega coefficients. The overall scale demonstrated excellent internal consistency, with Cronbach's alpha of 0.961 and McDonald's omega of 0.958. At the subscale level, Cronbach's alpha values ranged from 0.945 to 0.961, and McDonald's omega coefficients ranged from 0.884 to 0.918, reflecting strong internal consistency across all three factors. Although alpha coefficients above 0.90 may suggest potential item overlap, such values may be acceptable in instruments measuring closely related dimensions of a unified construct. Accordingly, the very high internal consistency coefficients were interpreted cautiously, as they may reflect both strong coherence among items and a degree of similarity in item content. However, detailed item-level analyses, including corrected item–total correlations, inter-item correlations, and redundancy assessments, were not performed in the present study and should be considered in future validation studies.

Test–retest reliability was assessed using the Intraclass Correlation Coefficient (ICC) based on a two-way random-effects model with absolute agreement. The questionnaire was administered to a subsample of 50 family caregivers on two occasions with a 14-day interval. The total scale showed excellent temporal stability, with an ICC of 0.996 (95% CI: 0.993–0.998). The ICC values for the three subscales ranged from 0.993 to 0.994, indicating highly consistent responses across repeated measurements. Although these findings support strong temporal stability, the magnitude of the ICC should also be interpreted cautiously, because highly consistent responses over a relatively short 14-day interval may partly reflect stability in participants' clinical and caregiving circumstances during the reassessment period.

Overall, these findings provide evidence of strong internal consistency and temporal stability of the Persian FICQ within the cardiac surgery-related inpatient settings examined in this study, while the very high reliability coefficients warrant cautious interpretation and further item-level evaluation in future validation studies (Table 5).

Table 5
Reliability indices of the Persian FICQ

Scale/subscale	Items	Cronbach's α	McDonald's ω	ICC
Total FICQ	Q1–Q16	0.961	0.958	0.996
Information and Communication	Q1–Q5	0.945	0.918	0.993
Participation in Care and Decision-Making	Q6-Q9	0.953	0.884	0.994
Support and respect	Q10–Q16	0.961	0.901	0.994

Note. ICC = Intraclass Correlation Coefficient; FICQ = Family Involvement in Care Questionnaire.

Discussion

The present study aimed to translate, culturally adapt, and evaluate the psychometric properties of the Persian version of the Family Involvement in Care Questionnaire (FICQ) among family caregivers of patients hospitalized in cardiac surgery-related inpatient settings in Iran. Overall, the findings provide evidence supporting the validity and reliability of the Persian FICQ within the specific clinical context examined in this study. Beyond demonstrating acceptable psychometric properties, the findings suggest that family involvement during hospitalization is a multidimensional construct that encompasses informational exchange, active participation in care decisions, and relational support. Therefore, assessment of family involvement requires instruments that capture different aspects of caregivers' experiences rather than focusing solely on observable caregiving activities. The Persian version retained the three conceptual domains of the original instrument, including Information and Communication, Participation in Care and Decision-Making, and Support and Respect, suggesting that the core dimensions of family involvement were preserved during the cultural adaptation process(13, 15).

The translation and cultural adaptation process followed established methodological recommendations emphasizing semantic, conceptual, experiential, and contextual equivalence rather than literal translation alone. The satisfactory content validity findings observed in this study indicate strong agreement among experts regarding the relevance, clarity, and cultural appropriateness of the Persian items. These findings

support the importance of systematic adaptation procedures when transferring patient- and family-centered care instruments across different linguistic and cultural contexts(13, 33).

Exploratory factor analysis supported a three-factor structure consisting of Information and Communication, Participation in Care and Decision-Making, and Support and Respect, with the three factors explaining 49.0% of the total variance. This finding extends the initial development work of Drakenberg et al., who developed the original FICQ and established its conceptual relevance through expert review and cognitive testing among family members of patients undergoing cardiac surgery(13). While the original instrument provided an important conceptual framework for understanding family involvement in care, the present study contributes additional evidence by examining its factorial structure, construct validity, and reliability after translation and cultural adaptation into Persian. Similar to the original conceptualization of the FICQ, the Persian version retained three interrelated dimensions reflecting information exchange, participation in care and decision-making, and supportive family–healthcare interactions. However, differences in healthcare systems, cultural expectations regarding family roles, and patterns of caregiver participation may influence how family involvement is experienced and reported across different populations. Therefore, cross-cultural validation remains essential before applying the instrument across diverse healthcare contexts.

Although the proportion of explained variance was moderate, the adequacy of a factor solution should not be interpreted solely based on the percentage of variance explained, particularly for multidimensional behavioral and psychosocial constructs. In the present study, the three-factor solution demonstrated theoretical coherence with the original FICQ structure, acceptable item loadings, adequate communalities, and was further supported through confirmatory factor analysis in an independent subsample. Therefore, the retained factor structure provides a meaningful representation of family caregivers perceived involvement in inpatient care.

Although the three-factor solution was consistent with the conceptual structure of the original FICQ, the choice of rotation method should be considered when interpreting the factor solution. In the present study, Varimax rotation was applied to facilitate factor interpretation; however, because the dimensions of family involvement are conceptually related, oblique rotation methods may provide additional information regarding factor correlations and the underlying structure of the Persian FICQ. Future validation studies should examine the factor structure using oblique rotation approaches to further confirm the relationships among the identified dimensions.

In addition, although the three-factor solution was supported by theoretical consistency with the original instrument, interpretability of the extracted factors, acceptable item loadings, communalities, and subsequent confirmation through CFA, additional factor-retention procedures such as parallel analysis and the minimum average partial (MAP) test were not performed in the present study. Future validation studies incorporating multiple factor-retention criteria may provide further evidence regarding the optimal number of factors and strengthen the evaluation of the underlying structure of the Persian FICQ.

In comparison, Jafarpoor et al. developed and validated a family-centered care instrument for intensive care settings in Iran and identified a five-factor structure accounting for 63.4% of the variance(19). Differences between these findings may be explained by variations in construct definition, item content, clinical setting, and target populations. While the FICQ specifically focuses on family caregivers perceived involvement in inpatient care, broader family-centered care instruments may capture additional organizational and healthcare-system dimensions. Nevertheless, both instruments highlight communication, participation, and supportive interactions as important components of family involvement in healthcare(19).

The three identified dimensions further illustrate the multidimensional nature of family involvement during hospitalization. The Information and Communication domain reflects the importance of timely, understandable, and meaningful exchange of information between healthcare professionals and family caregivers. Previous literature has consistently identified communication and information provision as major family needs, particularly in acute and intensive care settings where uncertainty and emotional distress are common experiences among families(7, 9).

The Participation in Care and Decision-Making domain represents a more active form of family involvement, emphasizing the role of caregivers as partners in discussions, planning, and care-related decisions. This dimension may be particularly relevant in cardiac surgery-related inpatient settings, where patients often experience postoperative dependency and require coordinated support from healthcare professionals and family members(7, 34). The Support and Respect domain reflects the relational aspects of family-centered care, including recognition of family needs, dignity, empathy, and emotional support(35). Together, these domains indicate that family involvement extends beyond physical assistance and includes informational, behavioral, and emotional processes within healthcare relationships(35).

Confirmatory factor analysis and construct validity

Confirmatory factor analysis conducted in an independent and non-overlapping subsample further supported the three-factor structure identified through exploratory analysis. The acceptable model-fit indices and statistically significant standardized factor loadings indicate that the proposed structure provides an adequate representation of family caregivers perceived involvement in inpatient care. Evidence of convergent validity through Average Variance Extracted (AVE) and Composite Reliability (CR) values, together with discriminant validity assessment using established criteria, further supports the distinction between the three related but conceptually different dimensions of the Persian FICQ(36, 37).

The use of separate samples for EFA and CFA strengthens the interpretation of the findings because the factor structure was examined and subsequently confirmed in different groups of participants rather than being evaluated within the same sample. This methodological approach reduces the risk of overfitting the model to the exploratory dataset and provides stronger evidence regarding the structural validity of the instrument. The evaluation of structural validity through appropriate factor analytic

approaches is considered an important component of measurement-property assessment in instrument validation studies(36, 38).

However, these findings should be interpreted as evidence of overall structural validity within the studied sample rather than evidence of measurement equivalence across all caregiver subgroups, because measurement invariance across demographic and caregiving characteristics was not examined.

Reliability findings

The Persian FICQ demonstrated strong internal consistency and temporal stability, with high Cronbach's alpha and McDonald's omega coefficients and excellent test–retest reliability. These findings indicate that the instrument provides consistent and reproducible measurement of family caregivers perceived involvement within the studied inpatient context.

Compared with previous psychometric work on family-centered care instruments in Iran, the reliability estimates observed in the present study were relatively high. Jafarpoor et al. reported Cronbach's alpha of 0.89 and an ICC of 0.93 for an ICU family-centered care instrument developed among Iranian healthcare settings(19). Differences between reliability coefficients may reflect variations in construct definition, item composition, clinical context, and characteristics of study populations.

Although high reliability coefficients support measurement consistency, very high internal consistency values may also indicate potential similarity or redundancy among items. Therefore, the observed coefficients should be interpreted alongside the factor structure and future validation studies in more heterogeneous populations to further examine item performance and measurement stability(39).

However, item-level analyses such as corrected item–total correlations, inter-item correlations, and formal redundancy assessments were not performed in the present study. Therefore, although the high reliability coefficients indicate strong internal consistency, the possibility of item similarity or overlapping content cannot be completely excluded. Future studies should examine item-level performance and potential redundancy using additional item-based analyses to further refine the measurement properties of the Persian FICQ.

Health psychology perspective

From a health psychology perspective, family involvement in inpatient care can be conceptualized as a behavioral, emotional, and relational process shaped by interactions between patients, caregivers, and healthcare professionals. Hospitalization, particularly in complex clinical situations such as cardiac surgery, may increase caregivers' needs for information, communication, participation, and emotional support(1, 2). In cardiac surgery-related settings, these psychological and behavioral processes may be particularly relevant because caregivers often experience uncertainty regarding postoperative recovery, changes in patient dependency, and the need to adapt to evolving caregiving roles. Therefore, assessing perceived family involvement in this context may provide insight into how communication patterns,

perceived support, and participation opportunities influence caregivers' experiences during hospitalization.

The Persian FICQ provides a structured approach for examining these dimensions from the caregiver perspective. By capturing perceived involvement rather than only observable caregiving activities, the instrument may contribute to a better understanding of how family members experience their role within healthcare systems and how organizational contexts influence family engagement. This perspective is consistent with contemporary approaches to patient- and family-centered care that emphasize partnership, communication, and respect for family roles within healthcare relationships(1, 2, 5).

From a health psychology perspective, the Persian FICQ extends beyond measuring the presence or frequency of family involvement by assessing caregivers' subjective experiences within the healthcare relationship. These experiences may be influenced by psychological processes such as uncertainty management, perceived support, communication needs, sense of participation, and the caregiver's perceived role in the treatment process. By identifying these dimensions, the instrument may help recognize psychosocial needs among family caregivers and provide a structured framework for future research on family-centered psychosocial interventions. However, the effectiveness of such interventions requires evaluation through longitudinal and intervention-based research designs.

Practical implications

The Persian FICQ may provide researchers and healthcare teams with a structured instrument for assessing perceived family involvement within cardiac surgery-related inpatient settings similar to those examined in this study. The instrument may help identify areas related to information and communication, participation in care and decision-making, and supportive interactions that require further assessment.

The findings may inform future research and family-centered care initiatives by providing a standardized approach to examining caregivers' perceptions of involvement. However, the present study provides evidence regarding the measurement properties of the Persian FICQ rather than its responsiveness, effectiveness, or impact on clinical outcomes. Therefore, although the instrument may facilitate assessment and research related to family involvement, future longitudinal and intervention studies are required to determine whether its use can contribute to improvements in clinical practices or patient- and family-centered care outcomes(5, 7).

This study has several limitations. First, participants were recruited using convenience sampling from cardiac surgery-related inpatient settings affiliated with a single medical university in one geographic region of Iran. This approach may have introduced selection bias and may limit the generalizability of the findings to other regions, hospital types, clinical populations, and Persian-speaking family caregivers.

Second, family involvement may be influenced by cultural, institutional, organizational, and contextual factors that were not fully examined in this study.

Third, the cross-sectional design limited evaluation of changes in family involvement over time and the responsiveness of the Persian FICQ to clinical or educational interventions. Additionally, because family involvement was assessed using self-reported responses from family caregivers, social desirability bias cannot be completely excluded. Participants may have provided responses influenced by perceived expectations regarding family participation or their relationships with healthcare professionals. Future studies using mixed-method approaches or incorporating multiple perspectives, such as healthcare professionals' assessments, may provide a more comprehensive understanding of family involvement.

Fourth, criterion-related validity was not assessed because no external criterion measure was included. Future studies should examine associations between the Persian FICQ and other established measures of family involvement or related constructs.

Fifth, measurement invariance across relevant caregiver subgroups, including sex, relationship to the patient, educational level, and previous caregiving experience, was not examined. Although the study sample included caregivers with diverse demographic and caregiving characteristics, the total sample was divided into independent EFA and CFA subsamples, and further stratification for multi-group CFA would have resulted in relatively small subgroup sizes and potentially unstable parameter estimates. Additionally, although separate subsamples were used for EFA and CFA to strengthen the evaluation of structural validity, the sample size of each subsample may have limited the statistical power for more complex factor analytic procedures and subgroup-based analyses. Therefore, the present findings support the overall three-factor structure of the Persian FICQ within the studied sample but do not establish measurement equivalence across specific caregiver subgroups. Future studies with larger and more heterogeneous samples should evaluate configural, metric, and scalar invariance and further examine the stability of the factor structure across different populations.

Sixth, the rotation method used in the exploratory factor analysis should be considered when interpreting the factor solution. In the present study, an orthogonal Varimax rotation was applied. Given that the dimensions of family involvement are theoretically related, an oblique rotation approach, such as Promax or Oblimin, may have provided additional information regarding factor correlations and the underlying structure of the Persian FICQ. Future validation studies should re-examine the factor structure using oblique rotation methods to further evaluate the relationships among extracted factors.

Seventh, additional factor-retention procedures, such as parallel analysis and Velicer's minimum average partial (MAP) test, were not performed. Although the three-factor solution was supported by theoretical consistency with the original FICQ structure, interpretability of the factor solution, acceptable item loadings, communalities, and subsequent confirmation through CFA, future studies should incorporate multiple factor-retention criteria to further strengthen evidence regarding the optimal factor structure of the Persian FICQ.

Another limitation is that detailed item-level analyses, including corrected item–total correlations, inter-item correlations, and redundancy assessments, were not performed. Therefore, the potential overlap among items contributing to the high internal consistency coefficients remains uncertain. Future studies

should incorporate item-level evaluation to further examine the homogeneity and distinctiveness of the Persian FICQ items.

Eighth, floor and ceiling effects were not assessed in the present study. Therefore, the extent to which responses may cluster at the minimum or maximum possible scores remains uncertain. Future validation studies should evaluate floor and ceiling effects using item-level and scale-level response distributions to further examine the measurement performance and distributional characteristics of the Persian FICQ.

Finally, although multiple psychometric properties were evaluated, the study was not prospectively designed according to a comprehensive measurement-property framework such as COSMIN. Future multicenter and longitudinal studies involving larger and more heterogeneous samples should further evaluate the Persian FICQ across diverse clinical settings and populations, including criterion-related validity, responsiveness, measurement invariance, floor and ceiling effects, and other measurement properties within comprehensive psychometric frameworks.

Conclusion

This study provides a culturally adapted Persian version of the Family Involvement in Care Questionnaire (FICQ) and presents evidence supporting its validity and reliability among family caregivers of patients hospitalized in cardiac surgery-related inpatient settings in Iran. The Persian FICQ retained the original three-dimensional structure of family involvement, including Information and Communication, Participation in Care and Decision-Making, and Support and Respect, while demonstrating acceptable construct validity, internal consistency, and temporal stability within the studied population.

Within the specific cardiac surgery-related inpatient context examined in this study, the Persian FICQ may provide a structured approach for assessing family caregivers perceived involvement in care. However, the findings should be interpreted within the characteristics of the studied sample and healthcare setting, and the applicability of the instrument to other clinical populations and Persian-speaking healthcare contexts requires further validation.

Future multicenter studies involving larger and more heterogeneous samples are needed to further examine the psychometric performance, measurement properties, responsiveness to change, and applicability of the Persian FICQ across diverse clinical and organizational contexts.

Abbreviations

AVE: Average Variance Extracted
CFA: Confirmatory Factor Analysis
CFI: Comparative Fit Index
CR: Composite Reliability
CVI: Content Validity Index

EFA: Exploratory Factor Analysis
FICQ: Family Involvement in Care Questionnaire
GFI: Goodness of Fit Index
HTMT: Heterotrait–Monotrait Ratio
ICC: Intraclass Correlation Coefficient
KMO: Kaiser–Meyer–Olkin Measure of Sampling Adequacy
RMSEA: Root Mean Square Error of Approximation
SRMR: Standardized Root Mean Square Residual
TLI: Tucker–Lewis Index
α: Cronbach's alpha
ω: McDonald's omega

FICQ – Family Involvement in Care Questionnaire

Declarations

Acknowledgements

The authors would like to express their sincere appreciation to the faculty members and experts of the School of Nursing and Midwifery at Mashhad University of Medical Sciences for their valuable guidance and contributions throughout the research process. The authors also extend their gratitude to the family caregivers and clinical staff of the participating hospitals for their cooperation and support in completing this study.

This research was conducted as part of an approved project at Mashhad University of Medical Sciences.

Author Contributions

All authors contributed substantially to the development of this study.
Majid Danishfar participated in the study conception, design, data collection, data analysis, and drafting of the manuscript.
Dr. Abbas Heidari (supervisor) contributed to the study design, methodological guidance, data interpretation, and critical revision of the manuscript.
Dr. Zahra Sadat Manzari (advisor) contributed to the study design, cultural adaptation procedures, psychometric evaluation guidance, and critical manuscript review.

All authors read and approved the final version of the manuscript.

Funding

This research received no financial support or funding.

Data availability

The data analyzed in this study are accessible upon reasonable request from the corresponding author.

Ethical approval

This study received ethical approval from the Ethics Committee of Mashhad University of Medical Sciences (Ethics Code: IR.MUMS.NURSE.REC.1404.012). Formal permission to translate and use the Family Involvement in Care Questionnaire (FICQ) was obtained from its original developers. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki and relevant institutional guidelines and regulations.

Consent to participate

All participants were fully informed about the aims and procedures of the study and provided written informed consent prior to participation.

Consent to publish

Not applicable.

Competing interests

The authors declare no competing interests.

References

1. Rickert J. Patient-centered care: what it means and how to get there. Health Affairs Forefront. 2012.
2. Santana MJ, Manalili K, Jolley RJ, Zelinsky S, Quan H, Lu M. How to practice person-centred care: A conceptual framework. Health Expectations. 2018;21(2):429-40.
3. Davidson JE, Aslakson RA, Long AC, Puntillo KA, Kross EK, Hart J, et al. Guidelines for family-centered care in the neonatal, pediatric, and adult ICU. Critical care medicine. 2017;45(1):103-28.
4. Mitchell ML, Coyer F, Kean S, Stone R, Murfield J, Dwan T. Patient, family-centred care interventions within the adult ICU setting: An integrative review. Australian Critical Care. 2016;29(4):179-93.
5. Park M, Lee M, Jeong H, Jeong M, Go Y. Patient-and family-centered care interventions for improving the quality of health care: A review of systematic reviews. International journal of nursing studies. 2018;87:69-83.
6. Clay AM, Parsh B. Patient-and family-centered care: It's not just for pediatrics anymore. AMA journal of ethics. 2016;18(1):40-4.
7. Olding M, McMillan SE, Reeves S, Schmitt MH, Puntillo K, Kitto S. Patient and family involvement in adult critical and intensive care settings: a scoping review. Health Expectations. 2016;19(6):1183-202.
8. Håkansson Eklund J, Holmström IK, Kumlin T, Kaminsky E, Skoglund K, Höglander J, et al. "Same same or different?" A review of reviews of person-centered and patient-centered care. Patient

education and counseling. 2019.
9. Al-Mutair AS, Plummer V, O'Brien A, Clerehan R. Family needs and involvement in the intensive care unit: a literature review. Journal of clinical nursing. 2013;22(13-14):1805-17.
10. Coyne I, O'Neill C, Murphy M, Costello T, O'Shea R. What does family-centred care mean to nurses and how do they think it could be enhanced in practice. Journal of advanced nursing. 2011;67(12):2561-73.
11. Shields L, Zhou H, Pratt J, Taylor M, Hunter J, Pascoe E. Family-centred care for hospitalised children aged 0-12 years. Cochrane database of systematic reviews. 2012(10).
12. Baumann M, Evans S, Perkins M, Curtis L, Netten A, Fernandez JL, et al. Organisation and features of hospital, intermediate care and social services in English sites with low rates of delayed discharge. Health & social care in the community. 2007;15(4):295-305.
13. Drakenberg A, Prignitz Sluys K, Ericsson E, Sundqvist A-S. The Family Involvement in Care Questionnaire—An instrument measuring family involvement in inpatient care. Plos one. 2023;18(8):e0285562.
14. Bhalla A, Suri V, Kaur P, Kaur S. Involvement of the family members in caring of patients an acute care setting. Journal of Postgraduate Medicine. 2014;60(4):382-5.
15. Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the process of cross-cultural adaptation of self-report measures. Spine. 2000;25(24):3186-91.
16. Wild D, Grove A, Martin M, Eremenco S, McElroy S, Verjee-Lorenz A, et al. Principles of good practice for the translation and cultural adaptation process for patient-reported outcomes (PRO) measures: report of the ISPOR task force for translation and cultural adaptation. Value in health. 2005;8(2):94-104.
17. Zarea K, Negarandeh R, Dehghan-Nayeri N, Rezaei-Adaryani M. Nursing staff shortages and job satisfaction in Iran: Issues and challenges. Nursing & health sciences. 2009;11(3):326-31.
18. Shirazi ZH, Sharif F, Rakhshan M, Pishva N, Jahanpour F. The obstacles against nurse-family communication in family-centered care in neonatal intensive care unit: a qualitative study. Journal of caring sciences. 2015;4(3):207.
19. Jafarpoor H, Vasli P, Manoochehri H, Zayeri F. Measuring family-centered care in intensive care units: developing and testing psychometric properties. Signa Vitae. 2020;16(2):82-91.
20. Nematifard T, Tabrizi KN, Arsalani N, Fallahi-Khoshknab M, Borimnejad L. The barriers to family-centered care in the pediatric rehabilitation ward: A qualitative study. Journal of Pediatric Nursing. 2023;73:120-9.
21. Hansen KT. Patient and family centered care and nurses' caring attributes: D'Youville College; 2013.
22. Fabrigar LR, Wegener DT, MacCallum RC, Strahan EJ. Evaluating the use of exploratory factor analysis in psychological research. Psychological methods. 1999;4(3):272.
23. Worthington RL, Whittaker TA. Scale development research: A content analysis and recommendations for best practices. The counseling psychologist. 2006;34(6):806-38.

24. Organization WH. Process of translation and adaptation of instruments. http://www who int/substance_abuse/research_tools/translation/en/. 2009.
25. Polit DF, Beck CT. Nursing research: Generating and assessing evidence for nursing practice: Lippincott Williams & Wilkins; 2008.
26. Lynn MR. Determination and quantification of content validity. Nursing research. 1986;35(6):382-6.
27. Polit DF, Beck CT. The content validity index: are you sure you know what's being reported? Critique and recommendations. Research in nursing & health. 2006;29(5):489-97.
28. Waltz CF, Bausell BR. Nursing research: design statistics and computer analysis: Davis Fa; 1981.
29. Koo TK, Li MY. A guideline of selecting and reporting intraclass correlation coefficients for reliability research. Journal of chiropractic medicine. 2016;15(2):155-63.
30. Kaiser HF. An index of factorial simplicity. psychometrika. 1974;39(1):31-6.
31. Schermelleh-Engel K, Moosbrugger H, Müller H. Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. Methods of psychological research online. 2003;8(2):23-74.
32. Boateng GO, Neilands TB, Frongillo EA, Melgar-Quiñonez HR, Young SL. Best practices for developing and validating scales for health, social, and behavioral research: a primer. Frontiers in public health. 2018;6:149.
33. Arafat S, Chowdhury HR, Qusar M, Hafez M. Cross cultural adaptation and psychometric validation of research instruments: a methodological review. Journal of Behavioral Health. 2016;5(3):129-36.
34. Kynoch K, Chang A, Coyer F, McArdle A. The effectiveness of interventions to meet family needs of critically ill patients in an adult intensive care unit: a systematic review update. JBI Evidence Synthesis. 2016;14(3):181-234.
35. Blaylock BL, Johnson BH. Advancing the Practice of Patient--and Family-centered Geriatric Care: Institute for Family-Centered Care; 2001.
36. Fornell C, Larcker DF. Evaluating structural equation models with unobservable variables and measurement error. Journal of marketing research. 1981;18(1):39-50.
37. Henseler J, Ringle CM, Sarstedt M. A new criterion for assessing discriminant validity in variance-based structural equation modeling. Journal of the academy of marketing science. 2015;43(1):115-35.
38. Hair JF. Multivariate data analysis. 2009.
39. Tavakol M, Dennick R. Making sense of Cronbach's alpha. International journal of medical education. 2011;2:53.

Figures

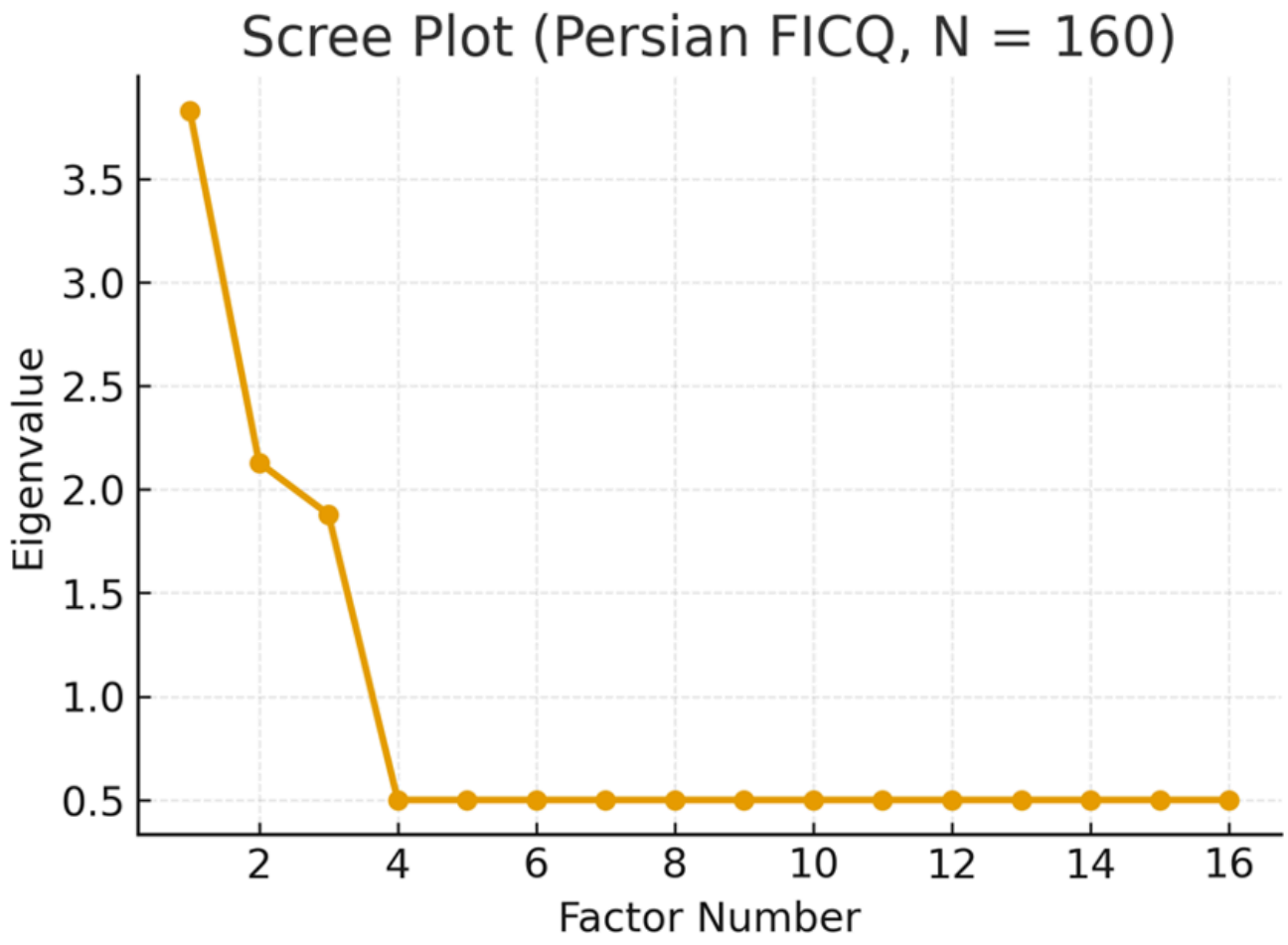


Figure 1

Scree Plot of the Extracted Components of the Persian Family Involvement in Care Questionnaire (FICQ)

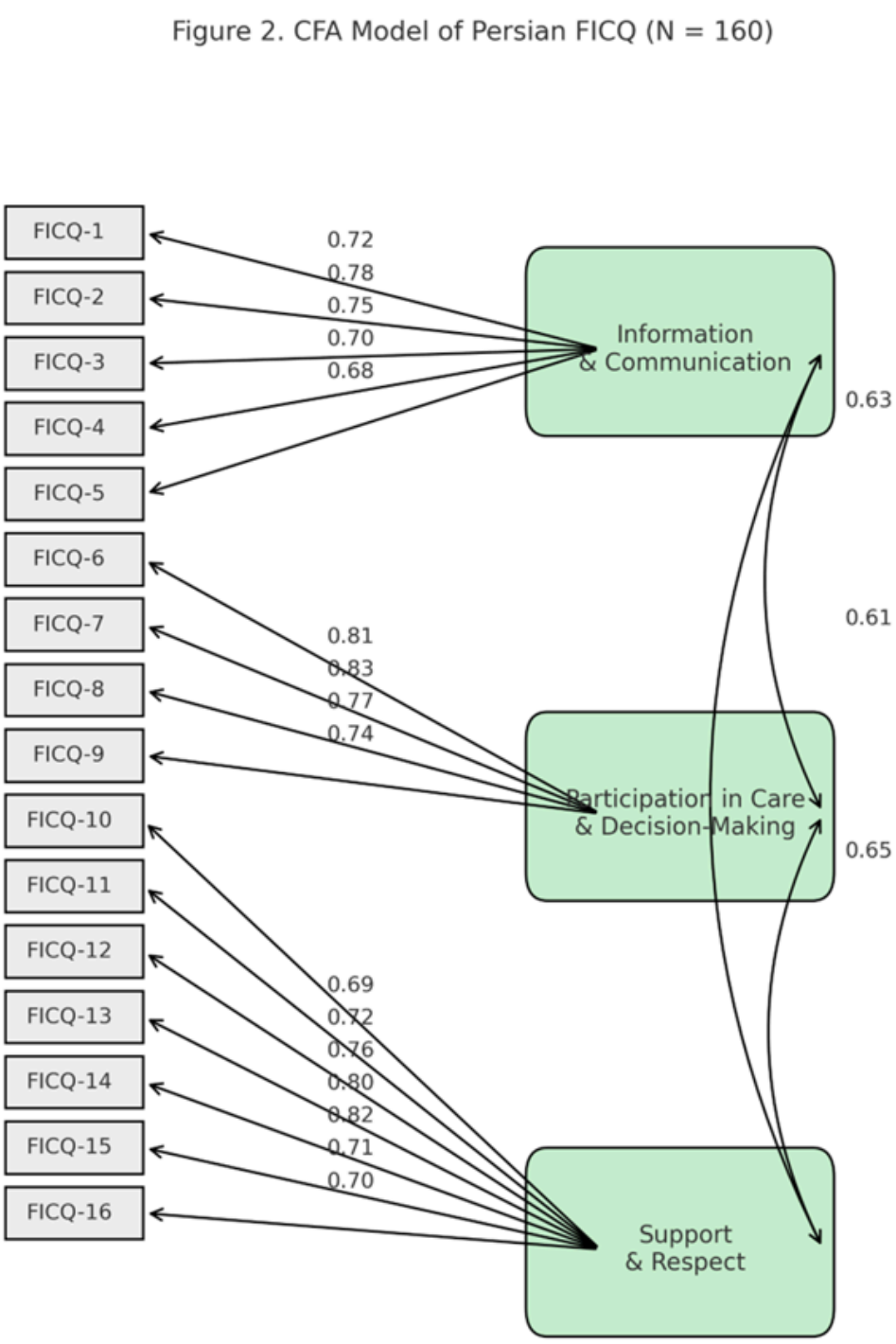


Figure 2

CFA Model of the Persian Family Involvement in Care Questionnaire (FICQ)