

Examining the Turkish Validity and Reliability of the Competency of Nursing Process Questionnaire: A Methodological Study

Hemşirelik Süreci Yetkinlik Ölçeği'nin Türkçe Geçerlik ve Güvenirliğinin İncelenmesi: Metodolojik Bir Çalışma

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ABSTRACT Objective: The objective of this study is to assess the cultural adaptation, validity, and reliability of the Competency of Nursing Process Questionnaire in Turkish. **Material and Methods:** The study included 355 nurses from 2 Central Anatolian hospitals in Türkiye. To ensure the adapted scale's items and its subdimensions were accurately aligned with the original structure, which is comprised of 24 items across 5 sub-scales namely "assessment", "diagnosis", "planning", "implementation", and "evaluation", confirmatory factor analysis was diligently employed as a methodological approach. For the purpose of assessing reliability, the study utilized the Cronbach's alpha value as a key estimator, reinforcing the scale's consistency. **Results:** Content validation involved feedback from 10 experts, yielding a Content Validity Index of 0.933. The adaptation's acceptability evidenced by the fit indices of the structural equation model within the confirmatory factor analysis domain. The Cronbach's alpha value for the complete scale was 0.972. **Conclusion:** In the study, it was determined that the Turkish version of the Competency of Nursing Process Questionnaire is a valid and reliable tool for assessing nurses' competencies in the nursing process, and it can be used to determine the nursing process competencies of nurses working in hospitals in Türkiye.

Keywords: Nursing; nursing process; competency; validity; reliability

ÖZET Amaç: Bu çalışmanın amacı, Hemşirelik Süreci Yetkinlik Ölçeği'nin kültürel adaptasyonunu ve Türkçe geçerlik ve güvenilirliğini test etmektir. **Gereç ve Yöntemler:** Çalışma grubunu, Türkiye'de İç Anadolu bölgesinde bulunan 2 hastanede çalışan toplam 355 hemşire oluşturdu. Uyarlanmış ölçeğin maddeleri ve alt boyutlarının, 24 madde ve "veri toplama", "tanılama", "planlama", "uygulama" ve "değerlendirme" şeklinde 5 alt-boyuttan oluşan orijinal yapıya uygunluğunu test etmek için doğrulayıcı faktör analizi yapıldı. Ölçeğin güvenilirlik analizini test etmek için Cronbach alfa değeri kullanıldı. **Bulgular:** Ölçeğin içerik geçerliliği 10 uzmandan alınan geri bildirimlerle sağlanmış olup, içerik geçerlilik indeksi 0,933 olarak bulundu. Uyarlamaya ilişkin kabul edilebilirlik, doğrulayıcı faktör analizi alanındaki yapısal eşitlik modelinin uyum indeksleri ile kanıtlandı. Ölçeğin toplamı için Cronbach alfa değeri 0,972 olarak hesaplandı. **Sonuç:** Çalışmada, Hemşirelik Süreci Yetkinlik Ölçeği'nin Türkçe versiyonunun, hemşirelerin hemşirelik süreci yetkinliklerini değerlendirmek için geçerli ve güvenilir bir araç olduğu, Türkiye'de hastanelerde çalışan hemşirelerin hemşirelik süreci yetkinliklerini belirlemek amacıyla kullanılabileceği belirlendi.

Anahtar Kelimeler: Hemşirelik; hemşirelik süreci; yetkinlik; geçerlik; güvenilirlik

The nursing process is a systematic approach utilized by nurses in patient care, encompassing stages of assessment, diagnosis, planning, implementation, and evaluation.¹ Nurses can better comprehend pa-

tients' health conditions, identify issues, and develop appropriate care plans through the nursing process.² The nursing process enables nurses to identify individual patient needs, thereby facilitating the creation

TO CITE THIS ARTICLE:

Basit G. Examining the Turkish validity and reliability of the competency of nursing process questionnaire: A methodological study. Türkiye Klinikleri J Nurs Sci. 2024;16(3):752-60.

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Peer review under responsibility of Türkiye Klinikleri Journal of Nursing Sciences.

Received: 04 Feb 2024

Received in revised form: 23 Feb 2024

Accepted: 30 Apr 2024

Available online: 17 May 2024

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of appropriate care plans, enhancing patient care outcomes, improving quality, minimizing errors in the treatment process, fostering communication among healthcare personnel, and ensuring patient safety.^{3,4} Therefore, the nursing process holds a pivotal role in healthcare services and is regarded as an indispensable element in the professional practice of nurses.⁵ The utilization of the nursing process additionally allows nurses to assess care plans and outcomes, offering the opportunity to modify and restructure care plans as needed. It contributes to the professional development of nurses and enhances their competence in patient care. Therefore, the integration of the nursing process into care practices is highly significant.

The nursing care plan is a personalized care plan prepared according to the individual needs of patients.⁶ This plan should address the patient's health issues and needs, encompassing treatment and care methods that support the patient's treatment and recovery process. Serving as a guide, the care plan outlines the treatment and care methods to be implemented for the patient and their family. Nurses continuously assess the patient's condition while creating the care plan and revise it as necessary.⁷

In studies concerning the nursing process, along with factors such as nurses' workload, level of education, characteristics of the work environment, nurse's lack of knowledge and skills on the subject, still remain among the factors influencing the utilization of the nursing process.⁸⁻¹¹ To overcome these inhibiting factors, it is essential to enhance nurses' competency in this area.

Nurses are expected to take on professional responsibilities to provide care tailored to the patient's needs. To achieve this, they need to enhance their nursing competencies. Nursing competency requires the integration of knowledge, skills, attitudes, values, and critical thinking abilities.¹² Nurses need to be knowledgeable about the nursing process, possess competency in care planning, and have the skills to implement these competencies to provide effective and quality patient care.¹³ Therefore, it is essential, particularly in clinical settings, to assess and enhance nurses' competencies. Measuring nurses' competency in nursing care planning using assessment and

evaluation tools helps them stay updated with current practices and facilitates their professional development. Through these tools, deficiencies in nurses' understanding of the nursing process can be identified, enabling the creation of training plans as needed. Consequently, this ensures that nurses provide effective and quality care in patient management.

In our country, there are scales examining nurses' competencies, competencies in patient-centered care, roles and competencies, cultural nursing competencies, ethical competencies, psychosocial care competencies, and holistic competencies.¹⁴⁻²⁰ However, there is no measurement tool specifically addressing competencies related to the nursing process. The utilization of the Competency of Nursing Process Questionnaire (CNPQ) will enable nurses to assess their proficiency in the nursing process, detect any shortcomings, and improve their competencies through targeted training in these specific areas. This study aims to investigate the Turkish validity and reliability of the CNPQ developed by Koy et al.⁵

MATERIAL AND METHODS

STUDY DESIGN

A methodological study design was applied in this study.

SETTING AND SAMPLES

This study population consisted of nurses working in the internal medicine (endocrinology, nephrology, neurology, hematology etc.) and surgical departments (surgery, orthopedics, cardiovascular service etc.) of two hospitals in Türkiye, one being a state hospital and the other a medical faculty hospital, both with a bed capacity exceeding 300. Following the suggestion that ten times the number of items is suitable for validity and reliability studies, a minimum of 240 nurses was targeted for the assessment of the "CNPQ" containing 24 items; however, the research was completed with the participation of 355 nurses.²¹ In the research, nurses with a minimum of one year of nursing experience who voluntarily participated were included, while nurses working in units such as the quality unit and sterilization-thus not actively utilizing the nursing process-were excluded from the study.

DATA COLLECTION INSTRUMENTS

Nurse Information Form

The form, developed by the researcher based on the literature, includes questions related to nurses' "socio-demographic" and "work characteristics".^{1,22} The section on socio-demographic traits includes inquiries about age, gender, and educational background. In the work-related section, there are questions regarding professional experience (years), willingness in the profession, working unit, type of work, weekly working hours, perception of the necessity of the nursing process, and self-assessment of feeling competent in developing care plans using the nursing process.

CNPQ

The scale developed by Koy et al. is a 5-point Likert-type scale comprising 24 items.⁵ It encompasses five subscales: data collection (4 items), diagnosis (5 items), planning (5 items), implementation (7 items), and evaluation (3 items). Respondents assign scores ranging from 1 to 5 to each item (1=No confidence in myself, 5=Feel sufficient in this skill). The scale does not possess a cut-off point, and there are no items reverse-scored. The scale score is determined by averaging the scores of its items and dividing that total by the number of items. As scores increase, it indicates an elevation in the competence of nurses within the nursing process. The original study by Koy et al. reported a Cronbach's alpha coefficient of 0.963 for the scale, indicating high internal consistency.⁵

DATA COLLECTION PROCESS

The data for the study were collected from nurses working at a state hospital and medical faculty hospital between June 7th and July 28th, 2023. The collection involved the utilization of the nurse information form and the CNPQ. After the necessary briefing, the forms were distributed to nurses by the researcher and collected on the same day once completed. The nurses took approximately 20 minutes to fill out the forms.

STUDY STAGES

Language Validity

Permission from Dr. Virya Koy, the scale's original developer, was obtained before two translators and

three nursing academicians with doctoral degrees independently translated it from English to Turkish. The researcher compared and merged these translations. An expert in Turkish language and literature reviewed the Turkish expressions, suggesting adjustments that were incorporated. Post modifications, a professional translator retranslated the scale into English. Two nursing academicians compared the original and back-translated versions to finalize the scale's form.

Content Validity

After confirming the content validity, a Turkish version of the scale was made and evaluated by 10 nursing faculty members for its content validity. The literature suggests seeking opinions from a minimum of 3 and a maximum of 20 experts.²³ The Content Validity Index (CVI) was computed for the scale by having experts rate each item as "unsuitable (1)," "needs adjustment (2)," "suitable but requires minor changes (3)," or "highly suitable (4)." To establish content validity, experts should rate at least 80% of the items between 3 and 4, resulting in a total score of 0.80 or higher.²⁴ In the study, besides calculating the average scores provided by experts regarding the items of the scale, their evaluations concerning the content of these items were also considered. Based on their feedback, suggested modifications were incorporated to restructure the scale items. The CVI was computed by assessing the experts' responses to refine and improve the scale items.

Pilot Study

After the scale was completed, a pilot study with 20 nurses evaluated the clarity of the data collection form. These individuals weren't part of the main sample. Nurses received printed forms, were briefed about the research, and provided written consent through an informed consent form. As no negative feedback was given about the scale's clarity and readability by the nurses, it was deemed sufficiently understandable.

Test-Retest Method

The test-retest method evaluates a measurement tool's consistency and stability over time. In this study, 30 nurses took the test twice, 2 weeks apart.

They encoded the last 4 digits of their phone numbers during the test. The scale was then matched and analyzed using these codes between the initial and follow-up tests.

STATISTICAL ANALYSIS

Data analysis was done using IBM SPSS Statistics Standard Concurrent User V 26 (IBM Corp., Armonk, New York, USA). The Shapiro-Wilk test checked numerical variables for normal distribution, independent samples t-tests compared two groups, and analysis of variance (ANOVA) assessed more than 2 categorical variables. Significant ANOVA outcomes prompted post hoc Bonferroni tests. Pearson correlation gauged relationships between numerical variables, while Cronbach's alpha determined internal consistency, indicating scale reliability. Sample size adequacy was evaluated via Kaiser-Meyer-Olkin (KMO) and Bartlett tests. Exploratory factor analysis (EFA) identified factorial structure, and test-retest reliability using an intraclass correlation coefficient (ICC). Confirmatory factor analysis (CFA) employed the AMOS (IBM; USA, Chicago) program. A significance level of $p < 0.05$ was considered statistically significant.

THE ETHICAL DIMENSION OF THE RESEARCH

Approval from Necmettin Erbakan University Health Sciences Scientific Research Ethics Committee (date: May 3, 2023; decision no: 2023/426) and written consent from participants was obtained. Institutional permissions were acquired from the medical faculty hospital (date: May 12, 2023; number: E-14567952-900-341945) and the state hospital (number: E-86737044-806.01.03-217358868, date: June 7, 2023) where the research was conducted. Written and verbal consent was obtained from the nurses participating in the study. Additionally, permission was obtained via email from the author who developed the scale. The principles stated in the Declaration of Helsinki were followed in the research.

RESULTS

The participating nurses' average age was 31.49 ± 7.75 years, with an average professional experience of 8.99 ± 7.75 weeks and a weekly working time of 42.44 ± 4.20 hours. Among them, 79.4% were female,

75.2% held a bachelor's degree, and 75.7% intentionally chose nursing as their profession. About half (48.5%) worked in internal units, 81.1% had rotating shifts, and 94.9% acknowledged the necessity of utilizing the nursing process in care. Additionally, 88.4% of the nurses felt proficient in preparing care plans.

CONTENT VALIDITY

Experts' opinions were assessed for content validity using the CVI for scope validity. Calculations provided validity ratios for each question, with no values resulting in zero or negative scope validity ratios. Consistency among expert opinions ranged between 0.80 and 1.0 for each item. The scale's scope validity index was computed as 0.933.

EXPLORATORY AND CFA

The KMO test indicated excellent suitability for factor analysis (KMO=0.968), affirming the adequacy of the distribution. Bartlett's test yielded a result of 7583.993 ($p < 0.05$), further supporting this assertion. Detailed information regarding factor loadings and sub-dimensions is provided in [Table 1](#).

According to [Table 1](#), factor loadings for questions within the assessment dimension range between 0.524 and 0.700. Questions in the patient problem/nursing diagnosis dimension have factor loadings ranging from 0.515 to 0.752. For the planning dimension, factor loadings vary between 0.535 and 0.753, for implementation between 0.556 and 0.720, and evaluation between 0.616 and 0.678. The cumulative explained variance of the scale is found to be 75.57%. Cronbach's alpha coefficients for the data collection, patient problem/nursing diagnosis, planning, implementation, evaluation sub-dimensions, and the total scale are 0.890, 0.917, 0.914, 0.919, 0.920, and 0.972, respectively.

The test-retest reliability of the scale was assessed using ICC. Test-retest reliability ($n=30$) was found to be assessment dimension [ICC=0.875, 95% confidence interval (CI)=0.738-0.941], diagnosis dimension (ICC=0.761, 95% CI=0.499-0.886), planning dimension (ICC=0.903, 95% CI=0.797-0.954), implementation dimension (ICC=0.900, 95% CI=0.790-0.952), and evaluation dimension (ICC=0.858, 95% CI=0.702-0.932).

TABLE 1: Results of the exploratory factor analysis and reliability CNPQ (n=355).

Factor	Item no	Factor loadings					Explained variance %	Cronbach alpha
		1	2	3	4	5		
Assessment	1				0.700		13.46	0.890
	2				0.676			
	3				0.642			
	4				0.524			
Diagnosis	5		0.664				15.63	0.917
	6		0.752					
	7		0.648					
	8		0.631					
	9		0.515					
Planning	10			0.578			15.29	0.914
	11			0.730				
	12			0.753				
	13			0.638				
	14			0.535				
Implementation	15	0.556					18.06	0.919
	16	0.633						
	17	0.622						
	18	0.694						
	19	0.720						
	20	0.720						
	21	0.593						
Evaluation	22					0.616	13.14	0.920
	23					0.678		
	24					0.658		
		Scale					75.57	0.972
KMO=0.968 df=276 $\chi^2=7583.993$ p<0.001								

CNPQ: Competency of Nursing Process Questionnaire; KMO: Kaiser-Meyer-Olkin test; df: Degree of freedom.

To evaluate the factor structure of the scale, χ^2 /degree of freedom (df), root mean square error of approximation (RMSEA), standardized root mean square residual (SRMR), Increment Fit Index (IFI), Tucker-Lewis Index (TLI), Confirmatory Fit Index (CFI), and Goodness of Fit Index (GFI) were utilized. In this study, $RMSEA \leq 0.05$, IFI, TLI, $CFI \geq 0.90$, and $GFI \geq 0.85$ were established as acceptable thresholds (Table 2). The model obtained for the CNPQ ($\chi^2=507.034$, $df=244$) consists of 24 items and 5 dimensions (Figure 1).

All path coefficients across the 24 items are significant ($p < 0.05$). Assessment includes items 1-4, diagnosis involves items 5-9, planning encompasses items 10-14, implementation involves items 15-21, and evaluation consists of items 22-24.

The scale showed mean scores of 4.28 ± 0.78 for assessment, 4.30 ± 0.75 for patient problem/nursing diagnosis, 4.28 ± 0.74 for planning, 4.27 ± 0.74 for implementation, and 4.34 ± 0.79 for evaluation. The

TABLE 2: The results of the CNPQ confirmatory factor analysis.

Scale	(χ^2/df)	RMSEA	SRMR	IFI	CFI	GFI	TLI
Model	2.078	0.055	0.031	0.965	0.965	0.894	0.960

CNPQ: Competency of Nursing Process Questionnaire; df: Degree of freedom; RMSEA: Root mean square error of approximation; SRMR: Standardized Root Mean Square Residual; IFI: Increment Fit Index; CFI: Confirmatory Fit Index; GFI: Goodness of Fit Index; TLI: Tucker-Lewis Index.

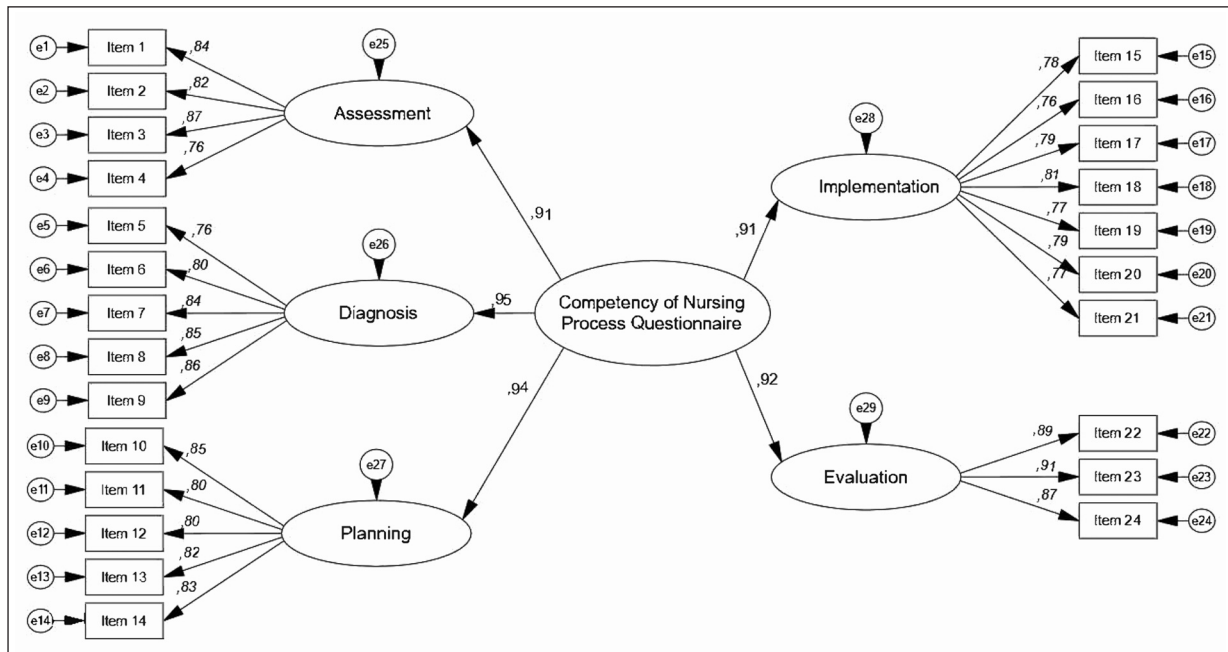


FIGURE 1: The confirmatory factor analysis model for the CNPQ.
CNPQ: Competency of Nursing Process Questionnaire.

overall mean was 4.29 ± 0.68 . Each dimension's total score resulted from the sum of responses divided by the respective item count; no reverse-scored items were present. Statistically significant positive associations were identified among CNPQ dimensions ($p < 0.05$).

The mean score of the CNPQ was found statistically lower in those with ten years or less of professional experience ($F = 12.558$, $p < 0.001$), while it was found higher for those working in internal services ($F = 6.105$, $p = 0.002$) and those feeling sufficient in care planning ($t = 6.034$, $p < 0.001$).

DISCUSSION

The fundamental nursing competencies encompass the ability to comprehend needs and requirements, apply knowledge into practice, provide patient-centered care, collaborate effectively with other health-care professionals, and coordinate care delivery.¹² For nurses to utilize their competencies encompassing these components effectively during the implementation of nursing practices, the use of the nursing process is imperative. Therefore, it is crucial to identify the competencies of nurses in utilizing the nursing

process. In this study aimed at examining the validity and reliability of the Turkish version of a scale developed to investigate nurses' competencies in the nursing process, it was established that the Turkish version of the scale is a valid and reliable tool.

The initial translation of the scale adaptation should always be carried out by at least two independent individuals, one informed about the subject matter and the other uninformed. The informed translator should be briefed on the subject, purpose, and objectives, while the other translator should naturally and impartially conduct their translation. In this study, the translation-back translation method was employed.²⁵ According to literature the CVI should exceed 0.80 for content validity.²⁶ In this study, the CVI value for the CNPQ was found to be 0.933, indicating that the scale accurately measures nurses' competencies in the nursing process and ensures content validity.

In the literature, it has been specified that for conducting factor analysis, the KMO value should be at least 0.60 and the Bartlett's test of sphericity should be statistically significant.²⁷ The KMO statistic ranges between 0 and 1, with values above 0.90 considered excellent.²⁸ While the original scale re-

ported a KMO value of 0.926, in this study, a KMO value of 0.968 was obtained.⁵ Additionally, the Bartlett's test of sphericity resulted in a significant chi-square value ($\chi^2=7583.993$, $p<0.05$), indicating that the data are normally distributed and the sample size is suitable for factor analysis.

In the study, the principal component analysis method was employed to derive the factors. The criterion for determining the appropriate number of factors considered selecting as many factors as eigenvalues greater than one. Additionally, factor rotation was performed to enhance the distinctiveness of variables contributing to each common factor. The varimax rotation method was applied for this procedure.²⁹ Consequently, it was determined that no items were excluded from the scale, and the scale consisted of 24 items and 5 factors, maintaining the original structure of the scale. In the literature, it is recommended that the explained total variance should be above 50%.³⁰ In this study, the scale with 5 factors accounted for 75.57% of the total variance. While the factor loadings in the original scale ranged from 0.45 to 1.00, in this study based on the results of EFA for the five-factor model, the factor loadings varied between 0.515 and 0.753.⁵ According to Seçer, factor loadings should exceed 0.30.³¹ These findings validate the construct validity of the scale.

CFA validates EFA-derived or theoretical structures.³² In CFA, the χ^2/df value is considered excellent if <2 and acceptable if <5 for an acceptable fit.³³ In the model, χ^2/df , RMSEA, SRMR, IFI, TLI, CFI, and GFI were examined. According to the literature, GFI and CFI should be >0.90 , TLI >0.95 , and RMSEA should be <0.08 .³⁴ Based on the calculated values for this study, the model fit is considered acceptable.

The scale's reliability was assessed using Cronbach's alpha coefficient. In this study, the total alpha coefficient was 0.972, similar to the original scale

(0.963).⁵ Alpha values between 1.00-0.80 are considered high, 0.60-0.79 are quite reliable, and 0.40-0.59 are low.³⁵ Therefore, the scale demonstrates high reliability.

LIMITATIONS

The limitations of the study include relying on self-report data from the participating nurses and conducting the research solely with nurses working in two hospitals located in Türkiye.

CONCLUSION

In conclusion, the CNPQ, comprising 24 items across five dimensions, validates the assessment of nurses' competency in the nursing process within Turkish hospital settings. It reliably evaluates nursing process skills, aiding systematic patient care planning for clinical nurses and guiding improvements. These results support its utility for nurse managers and educators. Furthermore, its potential for cross-cultural comparisons may advance the field. Future research should validate the scale across diverse samples to strengthen its reliability.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

This study is entirely author's own work and no other author contribution.

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