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Ethical sensitivity questionnaire for nursing students: psychometric properties of the Persian version

Amir Jalali[1], Azam Sharifi[2], Behrouz Soltany[2], Amirhossein Naghibzadeh[3], Jalal Karimi[3], Hooman Ghasemi[3], Parnia Kalhory[2] and khalil Moradi[2*]

Abstract

Objective Nursing students' ethical sensitivity is crucial for providing high-quality patient care. Assessing this sensitivity using standardized tools is essential for both students and professional nurses. This study aimed to determine the properties of cultural adaptation and the psychometric evaluation of the Ethical Sensitivity Questionnaire for Nursing Students (ESQ-NS).

Results This methodological study, conducted between April and November 2023, involved 480 nursing students who were selected through convenience sampling. The ESQ-NS was translated into Persian following the method described by Wild et al. (2005). The data were analyzed using SPSS (version 27) and LISREL (version 8.8) software. The EFA and CFA validated a three-factor, 13-item structure for the assessment tool. The Pearson correlation coefficient demonstrated a positive and significant correlation between the items and their respective subscales of the overall scale. The reliability of the Persian version of the ESQ-NS was confirmed with a Cronbach's alpha of 0.781, a MacDonald's Omega coefficient of 0.78, and an Intraclass Correlation Coefficient (ICC) of 0.78 (CI: 0.743- 0.816). The Persian version of the ESQ-NS demonstrates acceptable reliability and validity, making it a suitable tool for evaluating the ethical sensitivity of nursing students in Iran.

Keywords Ethical, Nursing students, Validity, Reliability

Introduction

The evolving landscape of healthcare, marked by technological advancements and a greater emphasis on standardized nursing interventions, has amplified the complexities inherent in nursing practice [1]. Nurses are increasingly central as patient advocates, navigating intricate ethical dilemmas in their multifaceted roles within the healthcare team [2]. Conflicting ethical values significantly influence nurses' professional behavior and societal perceptions, posing substantial ethical challenges [3]. Consequently, a high level of ethical competence, underpinned by ethical sensitivity and awareness, is paramount for nurses in their decision-making processes, which

*Correspondence:
khalil Moradi
moradi.khalil12@gmail.com
[1]Substance Abuse Prevention Research Center, Research Institute for Health, Kermanshah University of Medical Sciences, Kermanshah, Iran
[2]Department of Emergency and Critical Care Nursing, School of Nursing and Midwifery, Kermanshah University of Medical Sciences, Kermanshah, Iran
[3]Student Research Committee, Kermanshah University of Medical Sciences, Kermanshah, Iran

involve observing, analyzing, and evaluating the consequences of their actions [1, 4].

Ethical sensitivity, defined as the ability to recognize ethical conflicts, understand the nuances of a patient's vulnerability, and gain insight into necessary decisions [5], enables nurses to perceive and respond to the emotional needs of others [6]. Research indicates that ethical sensitivity in nursing students positively correlates with their ethical conduct, facilitating the integration of professional values when addressing ethical issues [7, 8]. Recognizing the importance of ethical sensitivity, its integration into nursing education is crucial for enhancing students' comprehension of ethical principles [9, 10], thereby preparing them to effectively manage ethical challenges [3]. Nursing students, whose future professional decisions profoundly impact patient well-being and their own practice [11, 12], represent a key group requiring robust ethical training to cultivate ethical sensitivity and reasoning skills essential for ethical decision-making [13]. Studies further suggest that ethics training improves patient communication and the capacity for complex ethical judgments [14].

Given the significant importance of ethical sensitivity in nursing students, it is crucial to develop a reliable instrument to evaluate this construct within this particular group. A comprehensive literature review reveals a lack of suitable instruments for evaluating ethical sensitivity specifically among Iranian nursing students. While Persian versions of several instruments designed for practicing nurses exist (e.g., ECCNQ-CCV [15], MDS-R [16], Nursing Moral Disengagement Scale [17], NEDM-EOLCS [18], EAS-IR [19]), their applicability to the distinct experiences of students is limited. Currently, no dedicated instrument has been validated to comprehensively assess ethical sensitivity within the Iranian nursing student population.

The Ethical Sensitivity Questionnaire for Nursing Students (ESQ-NS), developed by Muramatsu et al. in 2019 [3], offers a culturally relevant and psychometrically sound instrument specifically for nursing students. Its focus on core ethical principles like respect, justice, and confidentiality aligns with fundamental nursing values, making it a promising tool for measuring this crucial construct. Its successful adaptation in other cultural contexts, including Chinese [6], Korean [20], and Turkish [9], further highlights its potential for cross-cultural application.

The availability of a valid tool to measure ethical sensitivity in nursing students is vital for their professional development, enhancing nursing care quality, and protecting patient rights. Assessing ethical sensitivity levels can inform educational adjustments to improve professional standards and patient outcomes. Therefore, this study aims to translate, adapt, and psychometrically test the ESQ-NS for use with nursing students in Iran.

Method

Study design

This methodological cross-sectional study was conducted from April to November 2023 to determine the psychometric properties of the Persian version of the ESQ-NS. The study was executed in two main phases: the translation and cultural adaptation phase, followed by the psychometric evaluation phase.

Ethical sensitivity questionnaire for nursing students (ESQ-NS)

The ESQ-NS, developed by Muramatsu et al. in Japan in 2019 [3], consists of 13 items that measure three key areas: Respect for individuals (items 1–8), Distributive justice (items 9–11), and Maintaining patients' confidentiality (items 12–13). Nursing students' ethical sensitivity can be measured using the ESQ-NS. Each item is rated on a 4-point Likert scale, with one indicating "strongly disagree" and four signifying "strongly agree." Scores on the ESQ-NS range from 13 to 52, with higher scores reflecting greater ethical sensitivity among the students. The scale's Cronbach alpha value was computed to be 0.82.

The translation and cultural adaptation phase

Necessary authorizations were secured from the developers of the ESQ-NS for its translation into Persian. The translation of this instrument into Persian followed the ten-step method of Wild et al. (2005) [21], which includes:

- ***Step 1***: After selecting the instrument, permission to translate and analyze the tool's psychometric properties was obtained from the tool designer.
- ***Step 2***: Two independent translators used the forward method to translate the tool simultaneously from English to Persian.
- ***Step 3***: Following the research team's evaluation of the translations, the translated versions were consolidated into a unified version.
- ***Step 4***: Two translators who were not involved in the initial translation step translated the merged Persian version back into English simultaneously and independently.
- ***Step 5***: The research team examined both English translations, combined them into a single document, and forwarded this version to the original tool developer for feedback.
- ***Step 6***: All discrepancies and vocabulary issues were resolved by comparing the translated version to the original one. Finally, the alignment between

the translated versions and the original tool was confirmed.

- ***Step 7***: The final Persian version was distributed to ten nursing students who were not part of the initial sample to identify any uncertainties or potential inaccuracies, thereby ensuring face validity.
- ***Step 8***: The research team evaluated feedback from ten nursing students and implemented necessary revisions to perfect the final version of the instrument.
- ***Step 9***: The final draft was meticulously edited and endorsed by a specialist in Persian linguistics and literature.
- ***Step 10***: Finally, the final version was utilized for psychometric evaluations after documenting all the steps.

Participants and setting

Participants in this study included 480 nursing students from Kermanshah University of Medical Sciences in western Iran. Convenience sampling was used based on the following inclusion criteria: interest and willingness to participate, having educational records in nursing, and completion of at least one academic year. Exclusion criteria included questionnaire responses with more than 10% incompleteness [22]. Additionally, all participants completed the study's informed consent form.

The psychometric evaluation phase

In this phase, the evaluation focused on the content and construct validity, as well as the reliability of the Persian version of the ESQ-NS.

Content validity assessment

Qualitative content validity assessment

The questionnaire was distributed to 15 faculty members, researchers, and experts specializing in instrument psychometrics, medical ethics, and nursing sciences (nine members of the nursing faculty, three members of the medical ethics department, and three clinical nurses with a master's degree and extensive work experience) to establish qualitative content validity. These individuals were asked to evaluate the items of the scale for grammatical structure, expression, clarity, and their alignment with Iranian cultural norms.

Quantitative content validity assessment

The content validity ratio (CVR) and the content validity index (CVI) were used to assess the content validity of the instrument. The same 15 experts were invited to rate the necessity of the instrument items on a 3-point Likert scale as 'Essential,' 'Useful but not essential,' and 'Unessential' to calculate the CVR. Additionally, their suggestions for revisions on the item wording were collected and incorporated into the final version [23]. The Lawshe method was used to calculate the CVR of the instrument based on their rating scores. The minimum acceptable value for the CVR, considering the panel of 15 experts, was determined to be 0.49 [24].

The CVI can be used to assess the relevance of the instrument's items at both the individual item level (I-CVI) and the overall scale level (S-CVI). The same 15 experts were asked to rate the relevance of the ESQ-NS items using a 4-point Likert scale from 1 to 4 (1 = not relevant, 2 = somewhat relevant, 3 = quite relevant, 4 = highly relevant). The I-CVI was calculated by taking the ratio of experts who gave a relevance rating of 3 or 4 to the overall number of experts. Items with a CVI value above 0.79 were deemed suitable, and those with CVI values from 0.70 to 0.79 required modifications [25]. The S-CVI was determined by averaging the CVI values of all items [26].

Construct validity assessment

To assess the construct validity of the Persian version of the ESQ-NS, both exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were utilized. From a total of 480 participants, a subset of 180 was selected for EFA, while the remaining 300 were used for CFA, highlighting the importance of separating samples for each validation stage [27, 28]. Previous studies recommend a minimum of five participants per item for EFA [29] and generally suggest a sample size exceeding 200 for CFA [30, 31]. Therefore, the sample size in this study was deemed adequate.

In this study, EFA was performed using Varimax rotation. The researchers established that eigenvalues should exceed one and factor loadings should surpass 0.3 to attain an optimal construct [32]. The Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test of sphericity were utilized to evaluate sampling adequacy. KMO values should exceed 0.7, and Bartlett's test values should be less than 0.05 ($p < 0.05$) [33]. CFA demonstrates the effectiveness of each item in measuring the various dimensions of the scale. The evaluation of the model's fit was based on the following criteria: $\chi 2/df$ should be less than three, and the RMSEA should be under 0.08 [34, 35]. The GFI should exceed 0.90, as should the CFI, TLI, and IFI, while the AGFI should be above 0.80 [36, 37].

Reliability

To evaluate the reliability of the ESQ-NS, both internal consistency and test-retest reliability methods were employed. The instrument's overall Cronbach's alpha, along with that of each individual item, was calculated to assess internal consistency, with values exceeding 0.7 considered satisfactory [38]. The ESQ-NS was subjected to a test-retest reliability assessment. It was administered to a different group of 30 nursing students, not part of the

initial sample, who completed the questionnaire on two separate occasions, 14 days apart. To clarify the level of reliability, the Intraclass Correlation Coefficient (ICC), Cronbach's alpha, and McDonald's Omega were calculated. Reliability is considered satisfactory if the values are at or above 0.75 [39].

Data collection

Data collection was conducted in person, aligning with the students' educational schedules after their classes had concluded. This process was organized in collaboration with the nursing faculty during classroom sessions. The questionnaires were completed under the researchers' guidance within 7–8 min. After completion, the questionnaires were individually reviewed and sequentially numbered. Out of the distributed questionnaires, 197 were completed for the EFA section, while 17 were excluded due to incompleteness. For the CFA section, 334 questionnaires were completed, with 34 excluded, resulting in a 90.4% response rate.

Data analysis

SPSS software version 27 and LISREL software version 8.8 were utilized for data analysis in this study. Descriptive statistics were used to summarize the demographic characteristics. The Waltz and Bausell index was utilized to verify the quantitative content validity [25]. Construct validity was confirmed using both EFA and CFA [40]. A p-value of less than 0.05 was accepted as the significance level for statistical tests. Skewness and Kurtosis of data distribution were used to evaluate the normality of data distribution. Cronbach's alpha coefficient and test-retest reliability were employed to ensure the tool's reliability [41].

Results

Descriptive results

In this study, 180 nursing students participated in the EFA stage. The participants had an average age of 22.58 ± 3.05 years, with a minimum age of 18 and a maximum age of 42. Among the participants, 52.8% were female, 33.33% were second-year undergraduate nursing students, and 82.8% reported having prior clinical experience (Table 1).

In the CFA stage, a sample of 300 nursing students was selected. The participants had an average age of 22.22 ± 2.71 years, with a minimum age of 18 and a maximum age of 42. Among the participants, 52% were female, 35.33% were second-year undergraduate nursing students, and 87.3% reported having prior clinical experience (Table 1).

Table 1 Demographic characteristics of participants in the study

Variables		*N* (%)	
		EFA *N* = 180	CFA *N* = 300
Gender	Female	95 (52.8)	156 (52)
	Male	85 (47.2)	114 (48)
Grade (year)	Second year	60 (33.33)	106 (35.33)
	Third year	56 (31.11)	109 (36.33)
	Fourth year	64 (35.56)	85 (28.34)
History of clinical activity	Yes	149 (82.8)	262 (87.3)
	No	31 (16.2)	38 (12.70
Professional ethical education	Yes	146 (81.1)	258 (86)
	No	34 (18.9)	42 (14)

Content validity

In the qualitative content analysis, six of the 15 experts recommended revisions for four specific items (items 4, 6, 9, and 13) to enhance clarity and comprehension. Following the review, the specified items were re-evaluated and subsequently confirmed. The quantitative content validity of the instrument was assessed using the CVR for the entire questionnaire, which was 0.85, with individual item scores ranging from 0.57 to 1. Additionally, the S-CVI, calculated using the Waltz and Bausell index, was 0.85, with scores ranging from 0.71 to 1.

The skewness observed across all items ranged from − 1.24 to 0.99, while kurtosis values ranged from − 1.2 to 0.9. Both metrics fall within the acceptable range of -2 to 2, indicating a roughly symmetrical distribution (Table 2).

Construct validity

Exploratory factor analysis (EFA)

An EFA was performed on the initial sample of 180 participants. In this study, the KMO value was found to be 0.86, and Bartlett's test of sphericity was statistically significant ($p < 0.001$), indicating that the data were suitable for factor analysis.

Principal Component Analysis (PCA) and Varimax orthogonal rotation were employed to extract factors. Factors with eigenvalues greater than one were selected to determine the number of factors. Collectively, the three factors, each with an eigenvalue exceeding one, accounted for 70.89% of the variance observed across the 13 questionnaire items.

The scree plot, generated from the factor analysis using SPSS, further supports the suitability of the three factors for the final analysis (Fig. 1). Table 2 displays the rotated factor matrix, where items with factor loadings greater than 0.3 and the highest loadings are allocated to their respective components.

Confirmatory factor analysis (CFA)

A CFA conducted using data from 300 nursing students utilized a three-factor model, which demonstrated a satisfactory fit. The fit indices were as follows: χ^2/df = 2.03, CFI = 0.97, AGFI = 0.80, IFI = 0.952, TLI = 0.96,

Table 2 Matrix of factor loadings for the questionnaire items of the ESQ-NS after rotation, along with skewness and kurtosis

No	Items	Factor Loadings			*Skewness*[c]	*Kurtosis*[d]
		1	2	3		
1	To prevent patient falls, the bedrails were raised.	**0.744**	0.128	−0.058	-1.24	0.6
2	Despite the patient's refusal to reposition due to pain, position changes were implemented to prevent postoperative complications.	**0.881**	0.089	0.004	−0.13	−0.68
3	Despite patients in the terminal phase of illness refusing position changes due to respiratory distress, position changes were performed every two hours to prevent pressure ulcers.	**0.819**	0.138	−0.068	−0.37	−0.56
4	An elderly patient who expressed a desire to return home was placed in a long-term care facility due to the lack of available family caregivers.	**0.860**	0.136	0.090	0.038	−0.64
5	A pressure-relieving mattress with a sensor and alarm was placed in the bed of patients who had experienced a fall on the unit.	**0.812**	0.036	0.022	0.36	-1.2
6	A patient with dementia, seated in a wheelchair and secured with a safety belt, was permitted to stay at the nursing station.	**0.803**	0.113	0.177	0.99	−0.088
7	The patient, who identified as a different gender, was uncomfortable with you observing them during a shower but agreed to it after being persuaded.	**0.821**	0.132	0.109	0.084	-1.13
8	To administer medication to a patient with dementia who refused to take it orally, the medication was crushed and hidden in a beverage without the patient's knowledge.	**0.778**	0.148	0.160	0.54	−0.68
9	At the request of a patient in the terminal phase of illness, two nurses coordinated to provide a bath.	0.224	**0.845**	−0.008	0.8	−0.041
10	At the request of an inpatient who always received bed baths, a regular bath was provided under the supervision of a nurse with the assistance of nursing assistants.	0.219	**0.850**	−0.076	0.33	0.9
11	To regulate the eating pace of patients with dysphagia, the patient was monitored for at least one hour during mealtimes and assisted with eating.	0.007	**0.762**	−0.012	−0.71	0.17
12	The status of the patient was reported to the charge nurse.	0.079	−0.023	**0.890**	−0.67	−0.4
13	The details of patient care were reported to the unit's clinical manager (shift leader, head nurse, supervisor).	0.071	−0.060	**0.874**	0.88	0.34
Eigenvalue		**5.821**	**1.948**	**1.448**		
Percentage of the variance (%)		**41.786**	**16.444**	**12.669**		

c. Skewness measures the degree of symmetry, or more specifically, the lack of symmetry, in a dataset

d. Kurtosis evaluates whether the data distribution has heavier or lighter tails compared to a normal distribution

RMSEA = 0.059, and SRMR = 0.046. Figure 2 illustrates the path diagram along with the factor loadings derived from the CFA. Additionally, as indicated in Table 3, Pearson's correlation test revealed a significant positive correlation between the subscales and the overall scale.

The factor loadings exceeded 1.96, confirming statistical significance at the 95% confidence level. Furthermore, The Lambda coefficient, representing a specific measure, is calculated using the factor loadings of all variables linked to a particular factor (Table 4).

Reliability

The reliability of the instrument is confirmed with a Cronbach's alpha of 0.781, a MacDonald's Omega coefficient of 0.78, and an ICC of 0.78 (ranging from 0.743 to 0.816). These indicators collectively validate the tool's reliability in the context of this research.

Discussion

This study successfully evaluated the psychometric properties of the Persian version of the ESQ-NS. The final adapted instrument yielded a three-factor structure: respect for individuals (8 items), distributive justice (3 items), and maintaining patients' confidentiality (2 items). The Persian ESQ-NS demonstrated satisfactory psychometric properties, evidenced by a CVR of 0.85 and a S-CVI of 0.85.

The cultural adaptation of the ESQ-NS has been undertaken in several other countries, providing a basis for comparison. The Turkish adaptation reported robust content validity with an I-CVI of ≥0.8 and an S-CVI of ≥0.95 [9]. Similarly, the Chinese version exhibited a high level of content validity, with an S-CVI/Ave of 0.956 [6]. The Korean adaptation also demonstrated strong content validity, with all items achieving an I-CVI exceeding 0.80 [20]. These consistent findings across diverse cultural contexts underscore the robust content validity of the ESQ-NS as a measure of ethical sensitivity in nursing students.

The original ESQ-NS identified three core factors: respect for individuals, distributive justice, and maintaining patients' confidentiality [3]. The Turkish adaptation also validated a three-factor structure through both EFA and CFA [9]. The Chinese [6] and Korean [20] versions, while presenting slight variations in factor structures and

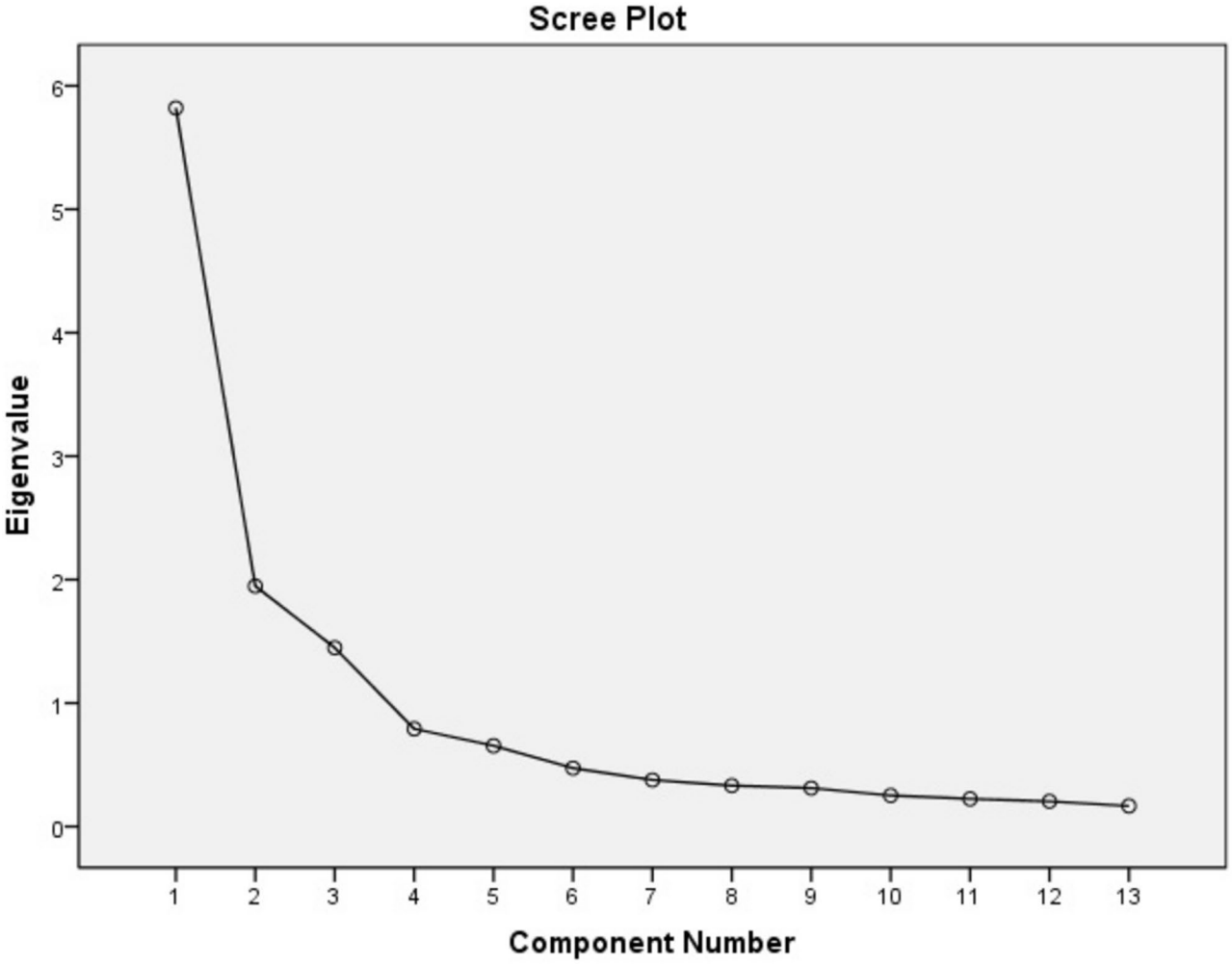

Fig. 1 Scree plot of the exploratory factor analysis of the Persian version of the ethical sensitivity questionnaire for nursing students (ESQ-NS)

item groupings via EFA, maintained comparable total variance explained, at 62.47% and 67.9%, respectively.

In the Chinese adaptation [6], factors such as "respect for individuals" (items 1, 2, 3, 5) and "reasonable care" (items 4, 6, 7, 8) were introduced alongside consistent factors, "distributive justice" and "maintaining patients' confidentiality." The Korean model [20], though similar in its three-factor approach, labeled the factors differently: "critical understanding of the patient" (items 1–5), "patient holistic care" (items 6, 8, 9, 10, 11), and "patient privacy and confidentiality" (items 7, 12, 13). These nuanced differences highlight cultural influences on ethical sensitivity within nursing education.

The "respect for individuals" factor accounted for the largest proportion of variance (41.78%) in the Persian version, highlighting the central importance of respecting patient autonomy and preventing harm in ethical nursing care. This aligns with findings from the Chinese adaptation, where "respect for individuals" and "reasonable care" collectively explained a significant portion of the variance (17.33% and 16.68%, respectively) [6]. The prominence of this factor resonates with established nursing theories like Watson's theory of human caring [42, 43]. Nurses enhance care quality and patient satisfaction by providing ethical care, which requires competencies such as respect, empathy, trust, and compassion, and empowering patients to make informed decisions [43, 44].

The "distributive justice" factor, while accounting for a smaller proportion of the variance (16.44%), remains a crucial aspect of ethical sensitivity, focusing on fairness in care delivery and resource allocation. While healthcare workers often face ethical dilemmas due to resource constraints and staff shortages [45], nursing students may have limited exposure to such challenges during their clinical rotations.

The "maintaining patients' confidentiality" factor explained 12.66% of the variance, underscoring the significance of privacy as a fundamental human right [46, 47]. Respecting patient safety is crucial for patient-centered

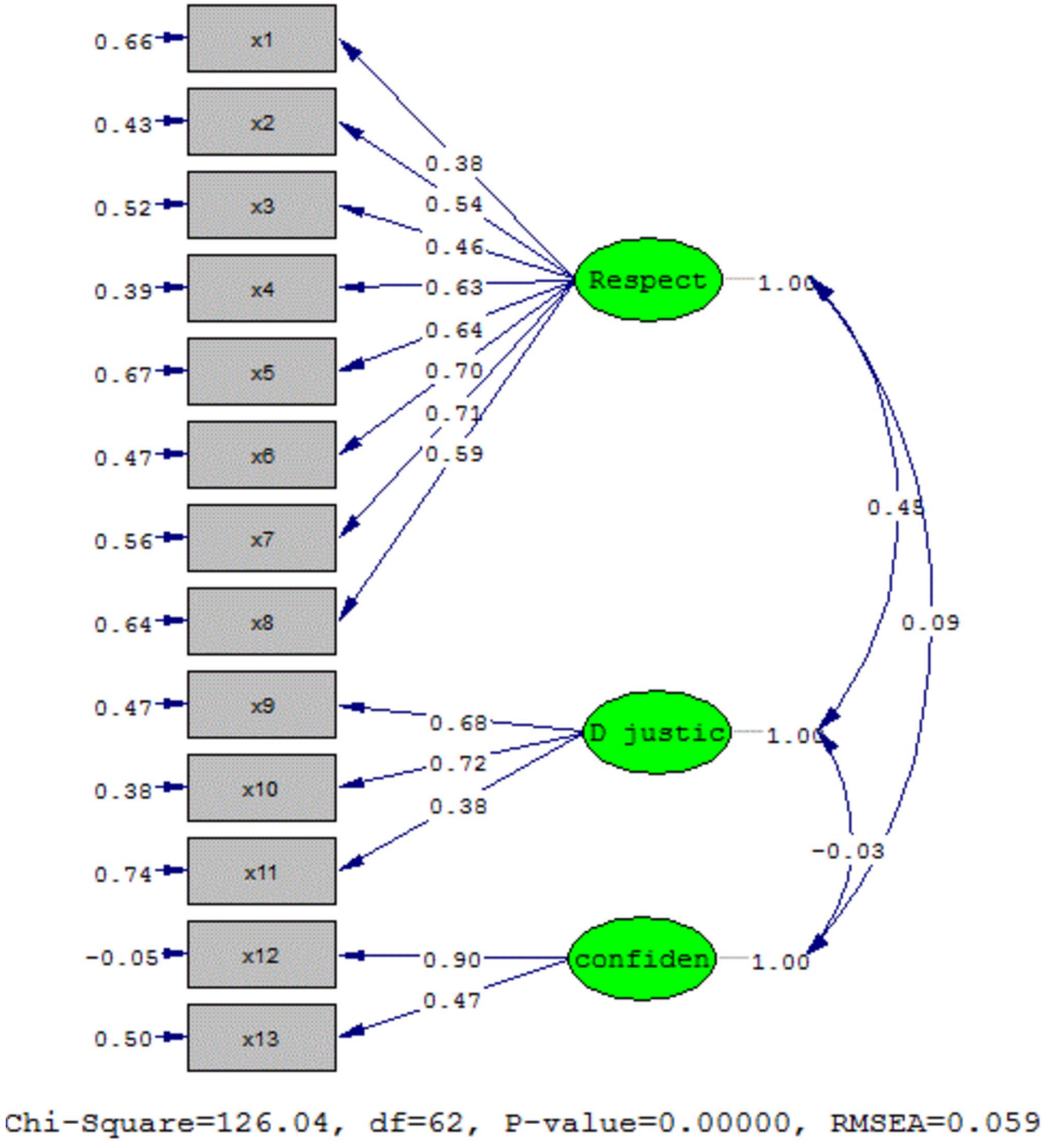

Fig. 2 Three-factor model of the ethical sensitivity questionnaire for nursing students (ESQ-NS)

Table 3 Pearson correlations for ESQ-NS domain scores

Factor	1	2	3
1. Respect for individuals	1		
2. Distributive justice	0.31**	1	
3. Maintaining patients' confidentiality	0.54**	−0.058**	1

Note: Correlations represent latent factor estimates derived from the CFA model. All correlations are statistically significant at $p < 0.001$

and ethical care, fostering comfort, security, and satisfaction, which can contribute to better patient outcomes [48–50].

CFA in this study supported the hypothesized three-factor structure, consistent with the original ESQ-NS [3], with satisfactory model fit indices aligning with those reported for the Turkish adaptation [9]. The strong factor

Table 4 T-values, Pearson's correlation coefficients, and factor loadings of the ESQ-NS

Factor	No	t_{value} [a]	[b](λ)	R^c	Cronbach's Alpha		McDonald's Omega	ICC
Respect for individuals	1	7.12	0.38***	0.626**	0.852	0.83	0.83	0.83 (CI: 0.8- 0.858)
	2	11.37	0.54***	0.758**	0.846			
	3	9.26	0.46***	0.699**	0.849			
	4	13.15	0.63***	0.778**	0.844			
	5	11.01	0.64***	0.663**	0.850			
	6	13.35	0.7***	0.729**	0.846			
	7	12.62	0.71***	0.742**	0.845			
	8	10.54	0.59***	0.717**	0.847			
Distributive justice	9	10.4	0.68***	0.432**	0.864	0.662	0.662	0.662 (CI: 0.575- 0.838)
	10	11.03	0.72***	0.42**	0.864			
	11	6.19	0.38***	0.216**	0.876			
Maintaining patients' confidentiality	12	2.3	0.9***	0.17**	0.878	0.729	0.73	0.73 (CI: 0.66- 0.784)
	13	2.25	0.47***	0.152**	0.879			
ESQ-NS						**0.781**	**0.78**	**0.78 (CI: 0.743- 0.816)**

***$P < 0/001$; **$P < 0/01$; * $P < 0/05$

(a) The calculated values for all factor loadings exceed 1.96, indicating statistical significance at the 95% confidence level, **(b)** The Lambda coefficient (λ) represents the factor loadings, which quantify the contribution of observed variables to their corresponding latent factor., **(c)** Pearson correlation coefficient

loadings further indicate a robust relationship between the items and their respective factors [51].

The Persian ESQ-NS demonstrated acceptable internal consistency (Cronbach's alpha = 0.781) and test-retest reliability (ICC = 0.78). These reliability coefficients are consistent with those reported for the original [3], Korean [20], and Chinese [6] versions, further supporting the Persian ESQ-NS as a reliable measure of ethical sensitivity in nursing students.

This study contributes to the existing literature by providing a validated instrument to assess ethical sensitivity among nursing students in Iran. Unlike instruments relying solely on self-reported beliefs [20, 52], the ESQ-NS assesses the perceived importance and sensitivity of ethical issues in clinical settings, offering valuable insights for nursing education.

Limitations

The study's findings are subject to several limitations. Convenience sampling from a single university in western Iran restricts the applicability of results to a wider population. Its cross-sectional design cannot establish causation. Future research should explore ethical sensitivity changes over time with larger, diverse samples and longitudinal designs.

Conclusion

Ethical sensitivity is vital for ethical competence in nursing practice. This study confirms the Persian ESQ-NS as a valid and reliable tool for assessing ethical sensitivity in Iranian nursing students. It can highlight strengths and weaknesses, aiding in the design of educational interventions to improve ethical competence and evaluate their success over time.

Abbreviations

ESQNS	Ethical Sensitivity Questionnaire for Nursing Students
CVI	Content Validity Index
CVR	Content Validity Ratio
KMO	Kaiser Meyer-Olkin
EFA	Exploratory Factor Analysis
CFA	Confirmatory Factor Analysis
TLI	Tucker Lewis Index
NFI	Normed Fit Index
GFI	Goodness of Fit Index
RMSEA	Root Mean Square Error of Approximation
PC	Principal Components
SRMR	Standardized Root Mean Square Residual
KUMS	Kermanshah University of Medical Sciences

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Author contributions

The study's design received unanimous approval and active participation from all authors. K.M.A.SH and A.J. contributed to designing the study. H.G., A.N., P.K., and J.K. collected the data. Data analyses were performed by A.J and B. S. The final report and manuscript were written by A.J., K.M., H.G., A.N., P.K., B.S., J.K., and A.SH. All authors read and approved the final manuscript.

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Data availability

The data analyzed during the current study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

The study was granted written authorization by the developer of the scale. Moreover, the Ethics Committee of Kermanshah University of Medical Sciences reviewed and approved the research, assigning it the ethical code: IR.KUMS.REC.1401.239. Written informed consent was obtained from all participants. The study was conducted in compliance with the Helsinki Declaration, adhering to appropriate guidelines and regulations throughout the procedures.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

Clinical trial number
Not applicable.

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