

The Turkish validity and reliability of the Kiersma–Chen empathy scale

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Abstract

Purpose: This study aimed to establish the Turkish validity and reliability of the Kiersma–Chen empathy scale (KCES) and determine its psychometric properties.

Design and Methods: This methodological study was carried out with 227 nursing students between April and May 2019.

Findings: The Cronbach's alpha coefficient of the total scale is 0.854, the test–retest coefficient was high for the total scale ($r = 0.989$), and total-item correlations ranged between 0.398 and 0.712.

Practice Implications: The KCES-TR is a valid and reliable scale to measure empathy in nursing students.

KEYWORDS

empathy, nursing students, reliability and validity

1 | INTRODUCTION

Empathy means experiencing someone else's emotional state.¹ Two domains (cognitive and affective) of empathy come into play in the health professional–patient interaction. The affective domain refers to healthcare professionals' ability to experience and share their patients' feelings, while the cognitive domain refers to healthcare professionals' ability to intellectually comprehend and define their patients' feelings.¹ According to Kerr-Gaffney et al.,² those two domains are associated with different brain structures, and affective empathy develops much earlier than cognitive empathy. Empathy plays a critical role in the therapeutic relationship and quality of care.³ Clinical nurses are in constant contact with patients who experience pain, anxiety, and uncertainty. An empathic understanding of patients' subjective experiences is necessary to meet their needs and improve care quality.⁴ Therefore, nurses should manage the affective and cognitive (emotion regulation) domains of empathy. Emotion regulation reduces the risk of burnout in the empathic patient–clinical nurse interaction.⁵

Nurses acquire communication skills during education, and empathy helps them develop those skills. Therefore, we should determine nursing students' empathy levels and plan interventions to

help them develop empathy skills before starting their professional careers.⁶ To achieve that end, we need valid and reliable instruments. Most scales that assess empathy are based on self-reports.⁷ The most common scales for assessing Turkish nursing students' levels of empathy are the empathic tendency scale (1988)⁸ and the scale of empathic skills (1990),⁹ both of which were developed by Dokmen.^{10–12} The basic empathy scale developed by Topcu et al.¹³ is another instrument for measuring the empathy levels of nursing students.^{14–17} The Jefferson scale of empathy for nursing students (JSENS), which was adapted into Turkish by Yanik and Saygili,¹⁸ has also come into use to evaluate the empathic orientation of nursing students.¹⁹

The Kiersma–Chen empathy scale (KCES) was developed by Kiersma et al.²⁰ Unlike other scales, the KCES is a short instrument based on the theory of empathy. It takes into account the standards of nursing and pharmacy education and allows us to evaluate the empathy levels of students for each patient group. The KCES consists of two domains: cognitive and affective. The validity and reliability of the KCES were established on a small sample, and therefore, further research is recommended in different universities with large samples. The KCES is used to evaluate the empathy levels of nursing^{21–24} and pharmacy students^{25–30} in clinical simulation training. It is also used

to assess nursing students' empathy levels before and after online training on disadvantaged and stigmatized groups.³¹

In his systematic review, Levett-Jones et al.⁶ concluded that clinical simulation focusing on disadvantaged patient groups and promoting reflective thinking is the best way for nursing students to develop empathy. Long-term applied studies with larger samples are needed to provide high evidence pointing to long-term changes in empathy. The KCES is becoming an increasingly popular theory-based instrument for measuring and developing empathy in nursing education. We believe that it is a promising measure that should be adapted to different languages and cultures. Therefore, this study aimed to establish the Turkish validity and reliability of the KCES and determine its psychometric and psycholinguistic properties.

The research questions were as follows:

1. What are the psychometric properties of the Turkish version of the Kiersma–Chen empathy scale (KCES-TR)?
2. What are the psycholinguistic properties of the KCES-TR?

2 | METHODS

2.1 | Design and participants

This was a methodological study. The study population consisted of all nursing students of the nursing faculty of a public university in Istanbul. A common rule of thumb for scale validity and reliability is to have a sample size five to ten times the number of items on the scale.³² The KCES consists of 15 items, and therefore, the sample size needed ranged from 75 to 150. The inclusion criteria were being 18 years of age or older, studying nursing, and volunteering. There were no exclusion criteria. The researchers informed nursing students of the research purpose and procedure. Written consent was obtained from those who agreed to participate. Participants chose nicknames for themselves to ensure anonymity. The sample consisted of 227 nursing students. The retest ($n = 188$) was performed two weeks after the original test.

2.2 | Instruments

2.2.1 | Demographic questionnaire

The researcher developed a demographic questionnaire consisting of four items on students' nicknames, age, gender, and grade level.

2.2.2 | Kiersma–Chen empathy scale

The KCES developed by Kiersma, Chen, Yehle, and Plake²⁰ is a self-report measure that consists of 15 items and two subscales: cognitive (nine items) and affective (six items). The cognitive domain

measures the ability to see the world from other people's perspectives, while the affective domain measures the ability to connect with other people's feelings or experiences. The KCES items are scored on a 7-point Likert type scale ("1 = Strongly Disagree," "2 = Disagree," "3 = Somewhat Disagree," "4 = Neither Agree or Disagree," "5 = Somewhat Agree," "6 = Agree," and "7 = Strongly Agree"). The KCES has high internal consistency reliability (Cronbach's alpha) (15 items; $\alpha = 0.82$). Items 4, 9, 11, and 15 are reverse scored. The total score ranges from 15 to 105. Higher scores indicate higher empathy.²⁰

Kiersma et al.²⁰ established the validity and reliability of the KCES on 158 pharmacy students and 58 nursing students. They used the conceptualization of cognitive and affective empathy³³ as the theoretical foundation for developing the scale. They developed several items on cognitive and affective empathy. They chose items assessing students' empathy according to the accreditation standards of pharmacy and nursing education. They developed the KCES to measure changes in empathy among pharmacy and nursing students after they participated in an aging-related simulation game. They performed confirmatory factor analysis and Cronbach's alpha (internal consistency) for validity and reliability, respectively. For concurrent validity, they used the Jefferson scale of empathy–health professional students (JSE-HPS). The result showed a moderate and positive correlation between the KCES and JSE-HPS. Nursing students had lower reliability and concurrent validity analysis results than pharmacy students. Therefore, future studies should recruit larger samples of nursing students. The developers did not perform a test-retest to establish the validity and reliability of the original scale.

2.2.3 | Jefferson scale of empathy for nursing students

The JSENS was adapted to Turkish by Yanik and Saygili.¹⁸ The JSENS consists of three subscales and 18 items scored on a seven-point Likert-type scale. The subscales are (1) perspective taking, (2) compassionate care, and (3) standing in the patient's shoes. The JSENS has a total internal consistency coefficient of 0.73. The item-total score correlations range from 0.11 to 0.46. The total score ranges from 18 to 126, with higher scores indicating higher empathic orientation.¹⁸

2.3 | Linguistic validity

First, the researchers and two translators translated the KCES from English into Turkish. Another two translators translated the Turkish version back into English. Afterwards, both the Turkish and English versions were evaluated and edited by the researchers and translators. A pilot study was conducted on ten nursing students to check the intelligibility of the form, which was then finalized based on the results. We then moved onto validity and reliability.

2.4 | Content validity

Ten experts (five psychiatric nursing specialists, two clinical psychologists, one forensic psychology specialist, one clinical psychiatric nurse, and one psychiatrist) were consulted to test the content validity of the KCES-TR. The content validity index (CVI) was calculated using the Davis technique. The experts were asked to assess the KCES-TR items using a 4-point rating scale (1 = not relevant, 2 = in need of revision, 3 = relevant but needs minor alteration, 4 = very relevant).³⁴ A CVI score of higher than 0.80 indicates adequate content validity. Item 6 had a CVI score of less than 0.80 after the expert assessment. The experts reviewed the Turkish version and then translated it back to English, which was sent to the developer of the original scale. The researchers revised Item 6 based on the feedback of the developer. The KCES-TR had a CVI of 0.85 (Table 1).

2.5 | Data collection and analysis

Data were collected between April and May 2019. Test-retest was used to ascertain whether the KCES-TR could yield consistent results when repeated over time (reliability). The retest ($n = 188$) was performed two weeks after the original test ($n = 227$).³⁵ The data was based on self-report, and data collection lasted 15 to 30 min.

Data were analyzed using the Statistical Package for Social Sciences (SPSS 25.0) and Analysis of Moment Structures (AMOS 22.0) at a significance level of 0.05. Descriptive data were analyzed using the number, percentage, mean, and standard deviation. Validity and reliability were analyzed using confirmatory factor analysis, Pearson's correlation, item-total score correlation, Cronbach's alpha coefficient, test-retest correlation, and independent samples t test.

2.6 | Ethical considerations

Permission was obtained from the developer of the KCES. The study was approved by the Social and Human Sciences Research Ethics Committee of Istanbul University (07.01.2019/01). Permission was obtained from the nursing faculty. Nursing students were informed about the purpose and procedure of the study. Informed consent was obtained from those who agreed to participate.

3 | RESULTS

3.1 | Characteristics of participants

Of participants, 84.6% were women, and 19.8% were first graders, 24.2% second graders, 38.8% third graders, and 17.2% fourth graders. The mean age of participants was 21.11 ± 1.56 years.

3.2 | Reliability

Item-total score correlation, test-retest correlation, and Cronbach's alpha coefficient were used for reliability analysis. The "upper- and lower-27 percent rule" was used to determine the discriminative power of the items. Table 2 shows the independent group t test results and item-total score correlations. An item-total test correlation greater than 0.30 is adequate.³⁶ The item-total correlations (ITC) of participants' responses were calculated. Two items had an ITC of smaller than 0.30, and therefore, were removed from the KCES-TR. The remaining items had an ITC of 0.39 to 0.61, and all items were related to each other. Two groups were formed from the

TABLE 1 Content validity index of the KCES-TR ($N = 10$)

Experts	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10	Item 11	Item 12	Item 13	Item 14	Item 15
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2	✓	X	✓	✓	X	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	✓	✓	✓
5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
7	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
8	✓	✓	✓	✓	✓	X	✓	✓	✓	✓	✓	✓	✓	✓	X
9	✓	✓	✓	✓	✓	X	✓	✓	✓	✓	X	✓	✓	✓	✓
10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
I-CVI	0.9	0.8	0.9	0.9	0.8	0.7	0.9	0.9	0.9	0.9	0.8	0.8	0.9	0.9	0.8

Note: I-CVI: Item CVI.

Abbreviations: CVI, content validity index; KCES, Kiersma-Chen empathy scale.

TABLE 2 Results of item analysis for subscales of the KCES-TR

Subscales	Item no	Item-total score correlation	t	p value
Cognitive empathy	KCES_1	0.49	9.10	0.000***
	KCES_3	0.42	10.49	0.000***
	KCES_6	0.47	8.37	0.000***
	KCES_8	0.57	11.65	0.013***
	KCES_10	0.57	10.24	0.000***
	KCES_13	0.51	10.53	0.000***
	KCES_14	0.58	11.97	0.000***
Affective empathy	KCES_2	0.39	8.55	0.000***
	KCES_5	0.50	8.61	0.000***
	KCES_7	0.61	8.67	0.000***
	KCES_9	0.47	11.17	0.000***
	KCES_11	0.46	15.54	0.000***
	KCES_12	0.56	9.69	0.000***

Note: $n = 227$, $**n_1 = n_2 = 61$.

Abbreviation: KCES-TR, Turkish version of the Kiersma–Chen empathy scale.

*** $p < 0.05$.

upper and lower 27 percent of the total group and analyzed for item discrimination using an independent group t test. The results showed that the KCES-TR differentiated the upper 27 percent and the lowest 27 percent, indicating discriminative power.

The KCES-TR had a Cronbach's alpha of 0.85, indicating high reliability. The "cognitive" and "affective" subscales had a Cronbach's alpha of 0.78 and 0.74, respectively (Table 3). Also, The KCES-TR had a mean total item score of 74.70 ± 8.82 . The "cognitive" and "affective" subscales had a mean score of 39.70 ± 5.02 and 34.99 ± 4.64 , respectively (Table 3). Test-retest was used to ascertain whether the KCES-TR yielded consistent results when repeated over time. The test and retest correlation was high for the total scale ($r = 0.989$) and the "cognitive" ($r = 0.985$) and "affective" ($r = 0.980$) subscales ($p < 0.01$).

3.3 | Construct validity

Construct validity was determined using confirmatory factor analysis (CFA). Data suitability for factor analysis was analyzed using the Kaiser–Meyer–Olkin (KMO) coefficient and Bartlett's test of

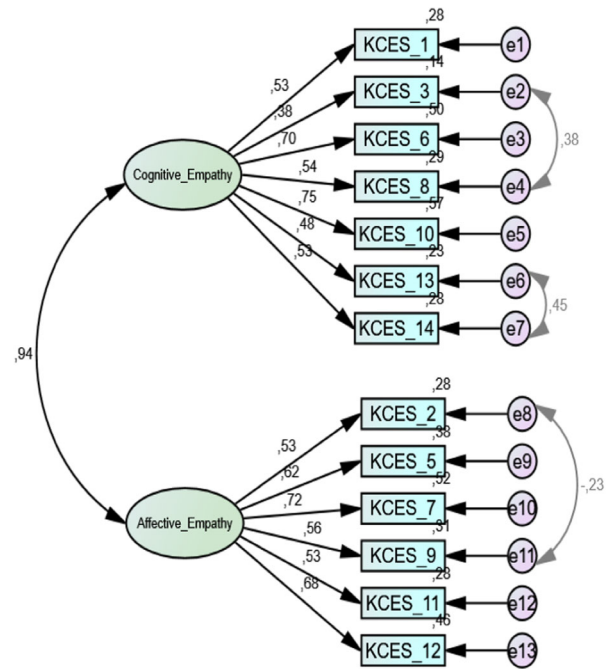


FIGURE 1 The diagram for the multilevel confirmatory factor analysis of the KCES-TR. KCES-TR, Turkish version of the Kiersma–Chen empathy scale

sphericity. A KMO coefficient higher than 0.60 and a statistically significant Bartlett's sphericity chi-square value indicates that data are suitable for factor analysis.³⁶ The KMO was 0.87, for which Bartlett's test of sphericity was significant ($p < 0.001$), indicating sampling adequacy and a correlation between the items for factor analysis. The first-order multifactorial confirmatory factor analysis yielded a two-factor structure for 13 items, with the lowest and highest factor loadings being 0.38 and 0.75, respectively. The diagram in Figure 1 shows the subscales and factor loadings.

The CFA showed that the structural equation model of the scale was significant ($p < 0.001$). According to the confirmation factor analysis of the KCES-TR, the root mean square error of approximation (RMSEA) (0.10), goodness of fit index (GFI) (0.84), adjusted goodness of fit index (AGFI) (0.78), and comparative fit index (CFI) (0.81) did not show a good fit in the first modification. After the post modification, the model was improved to identify the variables that reduced fit and to generate new covariances for residual values with high covariance. Afterward, the fit indices were recalculated and found to be within acceptable limits (Table 4). The RMSEA, GFI, AGFI, and CFI were within acceptable limits, while χ^2/df had high

TABLE 3 Reliability scores of the KCES-TR

Scale and subscales	Number of items	Cronbach's alpha	Mean \pm SD (min–max)
Cognitive empathy subscale	7	0.78	39.70 ± 5.02 (19–49)
Affective empathy subscale	6	0.74	34.99 ± 4.64 (9–42)
Total KCES-TR	13	0.85	74.70 ± 8.82 (28–91)

Abbreviation: KCES-TR, Turkish version of the Kiersma–Chen empathy scale.

Fit indices	Good fit indices	Acceptable fit indices	Pre modification	Post modification
RMSEA	0 < RMSEA < 0.05	0.05 < RMSEA < 0.10	0.10	0.08
GFI	0.95 < GFI < 1	0.90 < GFI < 0.95	0.84	0.90
AGFI	0.90 < AGFI < 1	0.85 < AGFI < 0.90	0.78	0.86
CFI	0.95 < CFI < 1	0.90 < CFI < 0.95	0.81	0.90
χ^2/df	$\chi^2/df < 3$	$3 < \chi^2/df < 5$	3.70	2.46

Abbreviations: χ^2/df , chi-square/degree of freedom; AGFI, adjusted goodness of fit index; CFI, comparative fit index; GFI, goodness of fit index; KCES-TR, Turkish version of the Kiersma-Chen empathy scale; RMSEA, root mean square error of approximation.

TABLE 4 Fit indices calculated as a result of confirmatory factor analysis of the KCES-TR

goodness of fit.^{35,37} These results indicated high construct validity (Table 4).

The Jefferson scale of empathy for nursing students was used to evaluate criterion validity. A statistically significant relationship between the JSENS and KCES and their subscales shows that the parallel forms satisfy criterion validity. There was a moderate positive correlation between the JSENS and KCES-TR ($r = 0.570$; $p < 0.01$), suggesting that the KCES-TR was a valid instrument (Table 5).

4 | DISCUSSION

Empathy plays a critical role in establishing therapeutic patient-nurse relationship and providing the proper nursing care.³⁸ An empathic approach to nurse-patient interaction increases the quality of care.³⁹ Therefore, we should develop valid and reliable measures to assess empathy in nursing students.

The KCES is used to assess empathy in nursing students and simulation training.^{21,30,31,40} The scale has not been adapted to any other language. However, studies report high reliability, indicating that it is an adequate measurement tool to assess empathy.^{21,22,30,31,40} This paper evaluated the psychometric and psycholinguistic properties of the Turkish version of the KCES. Language and content validity and confirmatory factor analysis were used for validity analysis. Item-total score correlation, test-retest correlation, and Cronbach's alpha coefficient were used for reliability analysis.

Reliability refers to the ability of a measure to yield sensitive and consistent results.³² Item 4, "I will not allow myself to be influenced by someone's feelings when determining the best treatment" and Item 15, "A healthcare practitioner should not be influenced by someone's feelings when determining the best treatment" were removed from the scale because they had an item-total score correlation of less than 0.30. Nurses play a therapeutic role, including performing the best available treatment chosen by the physician.⁴¹ Nurses in some countries can prescribe some medications, but it is not the case in Turkey. When scoring Items 4 and 15, our participants may have considered the fact that nurses in Turkey are not authorized to make a treatment decision, which may

explain the low item-total score correlations of those items. The remaining 13 items had a total-item correlation of 0.39 to 0.71, suggesting that the KCES-TR satisfied item-total score reliability.³⁶ The original KCES had a Cronbach's alpha of higher than 0.80.²⁰ The KCES-TR had a Cronbach's alpha of 0.85. The internal consistency coefficients of the scale and its subscales showed that the KCES-TR had high reliability. The KCES-TR had higher reliability than the original scale, which may be because our sample was larger than that of the original study.

Consistent results in repeated tests indicate the reliability of a measurement tool.³² Therefore, test-retest was used to ascertain whether the KCES-TR could yield consistent results when repeated over time (invariance). Although there is no consensus on the time interval between a test and retest, it should not be longer than three weeks.³⁵ The closer the correlation coefficient to 1, the better the time invariance of the measurement.³² The test-retest results had a strong correlation, suggesting that the KCES-TR yielded consistent results when repeated over time.

Validity refers to the degree to which a scale accurately measures what it intends to measure without confusing the measured construct with other constructs.³² There are four types of validity (content, criterion, logical, and construct), which should be satisfied by a valid scale.³² The KCES-TR had a CVI score of greater than 0.80. This result shows that the items are suitable for Turkish culture and represent empathy. Factor analysis was also used to evaluate the construct validity of the scale. A scale can be adapted to Turkish using only CFA³⁵ to determine to what degree a factorial model of several observable variables fits the actual data.³² As a result of confirmatory factor analysis, it was determined that the model fit indices of the 13 items in the scale were not at an acceptable level. In this case, it is recommended to improve the modification indices.³⁷ While making the improvement, the variables that reduced the fit were determined and new covariances were created for those with high covariance among the residual values. After the post modification, confirmatory factor analysis fit indices within acceptable limits suggest construct validity.³⁵ The confirmatory factor analysis results showed that the KCES-TR had an acceptable fit, indicating that the KCES-TR and the original scale had a similar factor structure. A factor loading shows the level of correlation between an item and

TABLE 5 Results of criterion validity of the KCES-TR

Correlation coefficient between scales and subscales	JSENS total score	JSENS perspective taking subscale total score	JSENS compassionate care subscale total score	JSENS standing in patient's shoes subscale total score
KCES-TR total score	0.570*	0.526*	0.415*	0.209*
Cognitive empathy subscale total score	0.450*	0.447*	0.273*	0.199*
Affective empathy subscale total score	0.597*	0.516*	0.493*	0.182*

Abbreviation: KCES-TR, Turkish version of the Kiersma–Chen empathy scale.

* $p < 0.01$.

the related factor. Factor loadings of all items are expected to be higher than 0.29.³² The factor loadings were assigned to the items according to the subscales in the original scale. The results pointed to two subscales: cognitive and affective empathy. Moreover, the concurrent validity method was used to determine the criterion validity of the scale. The JSENS was used to check concurrent validity. In the original study, concurrent validity analysis was performed using JSE-HPS. The results showed a moderate and positive correlation between the KCES and JSE-HPS. In the original study, nursing students had lower reliability and concurrent validity results than pharmacy students. We also found a moderate and positive correlation between the KCES-TR and JSENS, indicating that the KCES-TR satisfied criterion validity. These results show that the KCES-TR is a valid and reliable measurement tool.

4.1 | Strengths and limitations of the study

In the original study of the scale, the sample size of the study was very limited, and the test–retest method was not used in the reliability analysis of the scale. This study has a sufficient sample size, and reliability analysis was conducted in this study.

This study has some limitations. This study was conducted only with students studying nursing at a public university in Istanbul, and the majority of the sample consisted of female nursing students. For this reason, study results cannot be generalized to all nursing students.

5 | CONCLUSION

The KCES-TR is a valid and reliable measure of empathy in nursing students in Turkey. Future studies can use the scale to evaluate the effectiveness of interventions tailored to help nursing students develop empathy skills.

5.1 | Implications for nursing practice

The KCES-TR is a valid and reliable measurement tool that can be used to evaluate the effectiveness of interventions and clinical simulations to improve the empathy skills of nursing students. In this

way, nurses who provide nursing care in the clinical area after graduation will use their advanced empathy skills in patient–nurse interaction and care planning.

CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests.

AUTHOR CONTRIBUTIONS

All authors designed the study, collected data, analyzed the study, and wrote the manuscript. All authors approved the final version for submission.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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How to cite this article: Sahin-Bayindir G, Sukut O, Yilmaz S, Kutlu Y. The Turkish validity and reliability of the Kiersma-Chen empathy scale. *Perspect Psychiatr Care*. 2022;58: 1096-1102. <https://doi.org/10.1111/ppc.12907>

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