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Development and validation of a scale for assessing nurses' approaches to ethical issues

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Abstract

Background A review of the literature indicates that while nurses are aware of ethical issues, they encounter significant challenges in ethical decision-making and its practical implementation. This study aims to develop the "Scale for Assessing Nurses' Approaches to Ethical Issues (SANAEI)" to evaluate nurses' approaches to ethical dilemmas in their practice.

Methods This study was conducted in two phases using qualitative and descriptive approaches, focusing on nurses working in hospitals in a province of Türkiye. The first phase, aimed at developing the item pool, took place between January 10 and February 24, 2023, with 34 participants. The second phase, conducted from June 3 to October 6, 2024, involved 600 participants, with 300 assigned to Exploratory Factor Analysis (EFA) and 300 to Confirmatory Factor Analysis (CFA). Qualitative data were collected through an "Interview Form", while quantitative data were obtained using the "Draft Scale Form for Assessing Nurses' Approaches to Ethical Issues". Data analysis was performed using MAXQDA for qualitative data and SPSS 25 for quantitative data.

Results The initial 78-item pool, derived from qualitative research, underwent content validity analysis, reducing it to 43 items. A pilot study with 50 participants further reduced the item count to 28. EFA resulted in a final 23-item scale with a three-factor structure and factor loadings ranging from 0.459 to 0.846. The three factors explained 56.734% of the total variance. The overall Cronbach's alpha coefficient was 0.924. The model fit indices were as follows: $\chi^2/df = 3.543$, RMSEA = 0.092, and CFI = 0.94.

Conclusion The "Scale for Assessing Nurses' Approaches to Ethical Issues" was determined to be a valid and reliable measurement instrument.

Keywords Ethics, Nursing ethics, Ethical problems, Confirmatory factor analysis, Ethical decision-making

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Introduction

Ethics is a branch of philosophy that explores values, norms, rules, and fundamental concepts, such as right and wrong or good and bad from a moral standpoint, and serves as the foundation for both individual conduct and social relationships [1]. The primary goal of ethics is to establish principles and rules that facilitate the development of ethical attitudes and ethical decision-making [2]. Due to the inherent nature of care, nursing and ethics are closely interconnected. Nurses conduct their practice by demonstrating ethical behavior. Ethics also serves as a guide for nurses in exhibiting moral conduct [3, 4].

In the healthcare sector, nurses, who are in constant communication with patients and their relatives and serve as the primary providers of care and treatment, frequently encounter ethical dilemmas that they struggle to resolve due to their expanding roles and responsibilities [5, 6]. Ethical challenges commonly faced by nurses include conflicts between team members or institutional policies regarding patient care and treatment, protecting patient rights, providing care for terminally ill patients, obtaining informed consent, allocating limited resources, and addressing unethical behaviors among colleagues [7]. A study reported that 37% of nurses experienced ethical dilemmas related to psychosocial care due to material shortages [8]. Another study conducted in four U.S. states identified the most frequently encountered ethical issues as patient rights protection, autonomy, informed consent, confidentiality, and breaches of privacy [9].

A review of studies conducted in Türkiye indicates that the most frequently encountered ethical issue among physicians and nurses in intensive care units is end-of-life decision-making [10]. Another study identified communication problems between patients and nurses as the most common ethical issue [11]. In her research, İştar Işıklı reported that the most prevalent ethical problems in healthcare institutions, as perceived by participants, included communication issues, excessive workload, disrespect, conflicts of interest, rule violations, injustice, and discrimination [12]. Similarly, Han conducted interviews with 35 nurses, and found that they frequently encountered workplace accidents, mobbing, violence, discrimination, excessive workload, noncompliance with hand hygiene protocols, and incorrect practices [13].

As professionals who spend the most time with healthy and ill individuals, nurses frequently face ethical challenges throughout their careers. Their problem-solving and ethical decision-making abilities play a crucial role in ensuring high-quality, positive, and reliable patient outcomes [14–16]. A review of the literature highlights deficiencies in nurses' ethical decision-making competencies [17, 18]. In a study investigating professionalism in nursing, Adams and Miller found that while nurses demonstrated high levels of professionalism in competence, continuous education, academic preparation, and theoretical knowledge, they exhibited lower professionalism in research, publication, and autonomy [19]. Utlu emphasized that integrating ethical decision-making into nursing practice was particularly challenging, as it was influenced by various personal and situational factors [6]. A study on ethical dilemmas in intensive care units revealed that while nurses exhibited ethical sensitivity, they experienced conflicts when making decisions [20]. Additionally, other studies found that approximately half of their participants encountered ethical issues and were unable to resolve these dilemmas [18]. In a study examining nurses' ethical decision-making levels, participants were asked about the forced administration of an intramuscular sedative to a psychiatric patient refusing treatment, and the responses were 50% in favor of administration, 30% against it, and 20% undecided [21].

Purpose

A review of existing studies suggests that nurses are aware of ethical issues but encounter challenges in the ethical decision-making process and its implementation. The literature lacks a measurement tool designed to assess nurses' ability to demonstrate an ethical approach when faced with ethical dilemmas. This study aims to develop the Scale for Assessing Nurses' Approaches to Ethical Issues (SANAEI) to assess how nurses approach ethical challenges within the framework of healthcare practices, working conditions, and cultural background.

Methods

Study design and procedure

This study was conducted in two phases using both qualitative and quantitative research methods. The data were collected from nurses working in three different hospitals located in a province of Türkiye: one Health Practice and Research Hospital and two hospitals affiliated with the Provincial Health Directorate.

Phase 1

In the first phase of the study, the phenomenological method, one of the qualitative research methods, was used to generate the items for the draft scale form. Maximum diversity and snowball sampling methods, which are among the purposeful sampling methods were used [22]. The data were collected using a 14-item questionnaire developed by the researchers to assess participants' individual characteristics, institutional background, and ethical awareness, as well as a Semi-Structured Interview Form. The Semi-Structured Interview Form consisted of 14 questions that explored the definition of the concept of ethics, nurses' ability to evaluate ethical issues and exhibit ethical behaviors, and their reflections on ethical challenges they encountered in their professional

careers. The semi-structured interview questions were developed as a result of the literature review conducted by the researchers for use in this study and have not been published elsewhere (Supplementary Table 1). Feedback on the interview questions developed for this study was obtained from ten faculty members from Nursing and one faculty member from Education, all with expertise in ethics and scale development, as well as from six doctoral-level expert nurses. The final version of the questions was refined based on their recommendations. To assess the clarity and effectiveness of the interview questions, a pilot study was conducted with six nurses, who were not included in the main study. Participants were informed about the study, that they could leave the study at any time, and their personal information would be kept confidential. Interviews were audio-recorded with participants' consent. They were conducted individually in a pre-designated private room within the study institutions. No one other than the researcher and the participant was present during the interviews. All interviews were conducted by the same researcher, who has sixteen years of nursing experience, a doctorate in Fundamentals of Nursing, a qualitative data analysis training certificate and had no prior professional connection with the participants. Following the interviews, the collected data were transcribed verbatim by the interviewer without any modifications. In qualitative research, when no new information is received from new participants, that is, when the data reaches saturation point, the process of recruiting new participants is stopped and the data collection process is terminated [22]. Data saturation was reached with the 32nd participant, and two additional interviews were conducted, one participant indicated that she wanted to withdraw during the interview and left the study. The study completed the study with a total of 34 participants. Data collection for this phase took place between January 10, 2023, and February 24, 2023.

In the analysis of the in-depth interviews conducted with the participating nurses, content analysis was performed using the MAXQDA (VERBI Software, Berlin, Germany) program.[22] The data collected by the researcher was examined, divided into meaningful sections and each section was named and codes were created. The determined codes were collected under categories that could explain the data set at a more general level; and the same types of categories were collected under themes. A systematic structure was created with the collected data and the relationships between them were explained [23, 24].

Additionally, in this study, data coding was carried out separately by the researchers and an expert statistician, and inter-coder agreement was calculated. An inter-coder agreement rate of at least 70%, preferably close to 80%, is generally expected [23]. In this study, the inter-coder agreement rate was determined to be 76.92% using Cohen Kappa Analysis.

As a result of the evaluation, the theme of ethical approaches was categorized into five main categories: the meaning of ethics, ethical issues encountered, the professional significance of demonstrating ethical behavior, nurses' approaches to ethical dilemmas, and factors preventing ethical behavior. The scale item pool was derived from the category "Nurses' approaches to ethical dilemmas". This category was structured into two subcategories and five codes: the Indifferent Approach Subcategory, which includes Indifference ($n = 14$) and Ignoring ($n = 9$); the Hesitant Approach Subcategory, which includes Emotional Response ($n = 21$) and Learned Helplessness ($n = 9$); and the Professional Approach Code. From the data obtained through the interviews, an initial item pool of 78 scale items was generated.

Phase II

The population of the study, consisting of three hospitals, was stratified. The participants were selected in proportion to the total number of nurses in each hospital, and thus, the stratified random sampling method was used. A review of the literature suggests that a minimum sample size of 300 participants is required for scale development studies [25]. Additionally, sources advocating for determining the sample size based on the number of items in the scale suggest that the sample size should be at least five to ten times the number of items [25–27]. Moreover, some studies propose that the dataset should be split for Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) [28–30], while others suggest that EFA and CFA should be conducted on separate sample groups [31, 32]. Considering various perspectives in the literature, the sample size was determined by ensuring that it was at least ten times the number of scale items, exceeding 300 participants, and forming separate groups for EFA and CFA. Based on these considerations, 300 participants were recruited for EFA and 300 for CFA, resulting in a total of 600 participants in the study sample. First, data were collected from 300 participants for the EFA sample. Then, data were collected from 300 participants for the CFA sample. When the literature was examined, it was stated that it was sufficient for 25–50% of those who participated in the EFA analysis to participate in the test-retest [24]. It is also stated that the ideal period between two measurements should be 15 days (2–4 weeks) [24, 33–35]. Following data collection, a two-week interval was observed, after which test-retest analysis was conducted with 150 participants, representing 50% of the EFA sample and 25% of the total sample [24]. The data were collected between June 3, 2024, and October 6, 2024. The researcher conducted face-to-face data collection with the participating nurses who were on

duty at the time the research was conducted and agreed to participate in the research during their break times, ensuring that their work was not disrupted. No data loss occurred, as data collection was conducted through face-to-face interviews. Consequently, there were no missing responses.

Statistical analysis

The quantitative data were analyzed using the Statistical Package for Social Sciences-25 (SPSS-25). The 78-item scale item pool, generated based on findings from the qualitative research phase, was evaluated for content and construct validity by 15 experts, including nine Nursing Faculty Members, one member who have studies in the field of ethics and scale development and four expert nurses who are receiving doctoral education. The Lawshe technique was used to assess expert opinions, and content validity ratio (CVR) and content validity index (CVI) were calculated. Based on these calculations, the item pool was reduced to 43 items. The draft scale items were reviewed for language and clarity with recommendations from a Turkish Language and Literature expert, leading to the finalization of the 43-item "Draft Scale for Assessing Nurses' Approaches to Ethical Issues". Draft Scale items were prepared in the form of a 5-point Likert-type scale. Participants were informed about the study, and were informed that they could leave the study at any time and that their personal information would be kept confidential. Written consent was obtained from all participants. A pilot study was conducted with a sample of 50 participants from the hospitals where the research was to be carried out. Following the pilot study, the number of items was reduced to 28. The nurses who participated in the pilot study were not included in the main study. The 28-item draft scale was then administered to the EFA sample ($n = 300$) and CFA sample ($n = 300$). To assess the suitability of the study data for factor analysis, the Kaiser-Meyer-Olkin (KMO) coefficient was used to evaluate sample adequacy, while the Bartlett's test of sphericity was applied to determine the relationships among variables. After conducting Exploratory Factor Analysis (EFA), the number of items was further reduced to 23. Subsequent Confirmatory Factor Analysis (CFA) and reliability analyses did not result in further item reductions. CFA was used to evaluate the scale model and model fit indices. To test the tendency of items to confirm each other, composite reliability analysis and average variance extracted (AVE) were applied for convergent and discriminant validity. The reliability of the scale and its subdimensions was assessed using Cronbach's alpha internal consistency analysis. Item-total correlation analysis was conducted to determine the fit of individual items within the overall scale, while upper-lower group item analysis was performed to identify differentiating items. To test the scale's stability over time, the test-retest method was used. Pearson correlation analysis and intraclass correlation coefficient (ICC) analysis were conducted to evaluate temporal reliability.

Ethical approval

Ethical approval for the study was obtained from the Non-Interventional Clinical Research Ethics Committee of Osmangazi University (E-25403353-050.99-327038, May 11, 2022). Subsequently, institutional permissions were obtained from Eskişehir Yunus Emre State Hospital and Eskişehir City Hospital through the Eskişehir Provincial Health Directorate (E-11202945-605.01, July 7, 2022), as well as from Eskişehir Osmangazi University Health Practice and Research Hospital (E-31186237-300-370867, August 17, 2022). All research activities were carried out in full compliance with the ethical standards outlined in the Declaration of Helsinki. In this study Human Ethics and Consent to Participate declarations: not applicable.

Findings

Validity of the scale for assessing nurses' approaches to ethical issues

The data for the study were collected from nurses working in three different hospitals. Two separate sample groups were formed for Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). The homogeneity of the distribution of variables in both sample groups was examined, and parameters with $p > 0.05$ were considered homogeneous (Table 1).

In the study, the Kaiser-Meyer-Olkin (KMO) value was calculated as 0.883. The result of Bartlett's test of sphericity was found to be significant, with a p-value of 0.001 (< 0.05) (Table 2). Principal component analysis indicated the presence of three factors with eigenvalues greater than 1 (1.875; 1.475; 1.007). The first factor explained 22.986% of the total variance, the second factor explained 17.848%, and the third factor explained 15.901%, resulting in a total variance explanation rate of 56.734% (Table 2). The scale items closest to the factor were determined using the Varimax rotation method. According to the EFA results, five items were removed from the scale due to factor loadings below 0.40: item 21 (0.365), item 28 (0.347), item 29 (0.392), item 32 (0.362), and item 57 (0.385) (Table 3). The final version of the "Scale for Assessing Nurses' Approaches to Ethical Issues" consisted of 23 items categorized into three dimensions: Factor 1 - Professional Approach, Factor 2 - Hesitant Approach, and Factor 3 - Indifferent Approach (Supplementary Table 2).

According to the results of Confirmatory Factor Analysis (CFA), the factor loadings of the subdimensions varied as follows: Factor 1 - Professional Approach (0.53–0.86), Factor 2 - Hesitant Approach (0.52–0.83),

Table 1 Individual characteristics of nurses participating in exploratory factor analysis (EFA) and confirmatory factor analysis (CFA)

Individual characteristics		Exploratory factor analysis- (EFA)		Confirmatory factor analysis- (CFA)		p
		No(n)	Percentage (%)	No(n)	Percentage (%)	
Hospital Name	University Hospital	97	32,33	97	32,33	1,000
	City Hospital	116	38,67	116	38,67	
	State Hospital	87	29,0	87	29,0	
Age	25 years and under	18	6,00	16	5,33	0,208
	26–35 years	158	52,67	127	42,33	
	36–45 years	58	19,33	72	24,0	
	45 years and over	66	22,0	85	28,34	
		Mean ± SD: 36,51 ± 8,74 Min-Max:23–55		Mean ± SD: 37 ± 9,56 Min-Max: 23–56		
Gender	Female	245	81,67	256	85,33	0,226
	Male	55	18,33	44	14,67	
Marital Status	Married	197	65,67	208	69,33	0,338
	Single	103	34,33	92	30,67	
Having Children	Yes	172	57,33	192	64,0	0,095
	No	128	42,67	108	36,0	
Education Level	Vocational High School	25	8,33	16	5,33	0,506
	Associate Degree	48	16,0	47	15,67	
	Bachelor's Degree	209	69,67	216	72,0	
	Graduate	18	6,0	21	7,0	
Job Position	Nurse	259	86,34	258	86,0	0,740
	Charge Nurse	19	6,33	23	7,67	
	Other	22	7,33	19	6,33	
Work Unit	Ward	145	48,33	146	48,67	0,489
	Intensive Care	85	28,33	82	27,33	
	Outpatient Clinic	32	10,67	39	13,0	
	Administrative Unit	5	1,67	1	0,3	
	Other	33	11,0	32	10,67	
Work Schedule	Day Shift	94	31,33	94	31,33	0,917
	Night Shift	6	2,0	6	2,0	
	Rotating Shift	197	65,67	195	65,0	
	Other	3	1,0	5	1,67	
Years of Professional Experience	0–2 years	21	7,0	20	6,67	0,458
	3–10 years	124	41,33	101	33,67	
	11–20 years	76	25,33	70	23,33	
	21–30 years	56	18,67	76	25,33	
	31 years and above	23	7,67	33	11,0	
		Mean ± SD: 14,76 ± 9,26 Min-Max:1–35		Mean ± SD: 15 ± 9,76 Min-Max:1–36		
Years in Institution	0–2 years	70		23,33		0,308
	3–10 years	158		52,67		
	11–20 years	46		15,33		
	21–30 years	20		6,67		
	31 years and above	6		2,0		
		Mean ± SD 8,95 ± 6,70 Min-Max:1–35		Mean ± SD: 8 ± 6,89 Min-Max: 1–32		
Ethics Training	Yes	275		91,67		0,479
	No	25		8,33		

and Factor 3 - Indifferent Approach (0.54–0.89) (Fig. 1). The fit indices obtained from the analysis were Chi-square/degree of freedom (χ^2/df) = 3.543, Root Mean Square Error of Approximation (RMSEA) = 0.092, Normed Fit Index (NFI) = 0.92, Non-Normed Fit Index (NNFI) = 0.93, Standardized Root Mean Square Residual (SRMR) = 0.081, Comparative Fit Index (CFI) = 0.94, Incremental Fit Index (IFI) = 0.94, and Goodness of Fit Index (GFI) = 0.81 (Table 4).

Table 2 SANAEI Kaiser-Meyer-Olkin (KMO) test, bartlett's test of sphericity, and total variance explained

Kaiser-Meyer-Olkin Measure of Sampling Adequacy				0.883
Bartlett's Test of Sphericity		Approx. Chi-Square		4445,281
		df		253
		Sig.		< 0.001
Factor	**(Eigenvalues)**	**Rotation Sums of Squared Loadings**		
		Total	**% of Variance**	**Cumulative %**
Factor 1	1,875	5,287	22,986	22,986
Factor2	1,475	4,105	17,848	40,834
Factor 3	1,007	3,657	15,901	**56,734**

To assess the convergent and discriminant validity of the scale, average variance extracted (AVE) values were calculated as 0.507 for the Professional Approach factor, 0.448 for the Hesitant Approach factor, and 0.625 for the Indifferent Approach factor. The composite reliability (CR) values were found to be adequate, with Professional Approach = 0.918, Hesitant Approach = 0.874, and Indifferent Approach = 0.890 (Table 5).

Reliability of the scale for assessing nurses' approaches to ethical issues

The reliability of the Scale for Assessing Nurses' Approaches to Ethical Issues was evaluated using internal consistency analysis, item analysis, and test-retest analysis. After conducting internal consistency analysis, the Cronbach's alpha values for the subdimensions were 0.822 for Professional Approach, 0.937 for Hesitant Approach, and 0.885 for Indifferent Approach. The overall Cronbach's alpha value of the scale was found to be 0.924, indicating high reliability.

The Cronbach's alpha reliability coefficient of the scale was found to be $\alpha = 0.924$. According to the item correlation analysis, all correlation values were above 0.30, indicating that all items represent the overall scale. When examining the correlation of items with their respective subdimensions, the correlation ranges were found to be 0.842–0.916 for Factor 1 - Professional Approach, 0.880–0.918 for Factor 2 - Hesitant Approach, and 0.905–0.918 for Factor 3 - Indifferent Approach. Additionally, removing any item from the scale did not improve the Cronbach's alpha value, confirming the internal consistency of the scale (Table 3). The results of the variance analysis indicated significant differences between the measurements ($p = 0.001$; $p < 0.05$), while the scale was found to have additivity ($p = 0.612$; $p > 0.05$) (Supplementary Table 3). The upper-lower group item analysis demonstrated that all items in the scale were statistically significant ($p < 0.05$) and possessed distinctive properties related to the subject under investigation (Supplementary Table 4). For the test-retest analysis, Pearson's correlation

Table 3 SANAEI items factor loadings results and item-total correlation values (EFA-300)

Item No	Factor Loading			Item–total score correlation	Item–subscale total score correlation	Cronbach's Alpha if Item Deleted	New Item No
	F1	F2	F3				
10	0,537			0,645	0,912	0,920	**1**
11	0,496			0,568	0,910	0,921	**2**
12	0,459			0,553	0,916	0,921	**3**
26	0,465			0,574	0,916	0,920	**4**
8	0,739			0,464	0,867	0,923	**5**
3	0,460			0,368	0,868	0,923	**6**
13	0,558			0,397	0,868	0,924	**7**
25	0,595			0,390	0,870	0,924	**8**
6	0,547			0,362	0,842	0,923	**9**
1	0,570			0,355	0,842	0,924	**10**
22	0,572			0,324	0,892	0,924	**11**
31		0,838		0,785	0,916	0,918	**12**
40		0,784		0,778	0,912	0,917	**13**
34		0,816		0,794	0,880	0,917	**14**
73		0,846		0,775	0,886	0,917	**15**
54		0,815		0,813	0,916	0,917	**16**
51		0,787		0,726	0,918	0,917	**17**
43		0,684		0,519	0,910	0,919	**18**
61			0,592	0,533	0,918	0,921	**19**
70			0,754	0,717	0,919	0,919	**20**
69			0,797	0,629	0,905	0,920	**21**
67			0,819	0,765	0,910	0,920	**22**
63			0,841	0,810	0,918	0,918	**23**

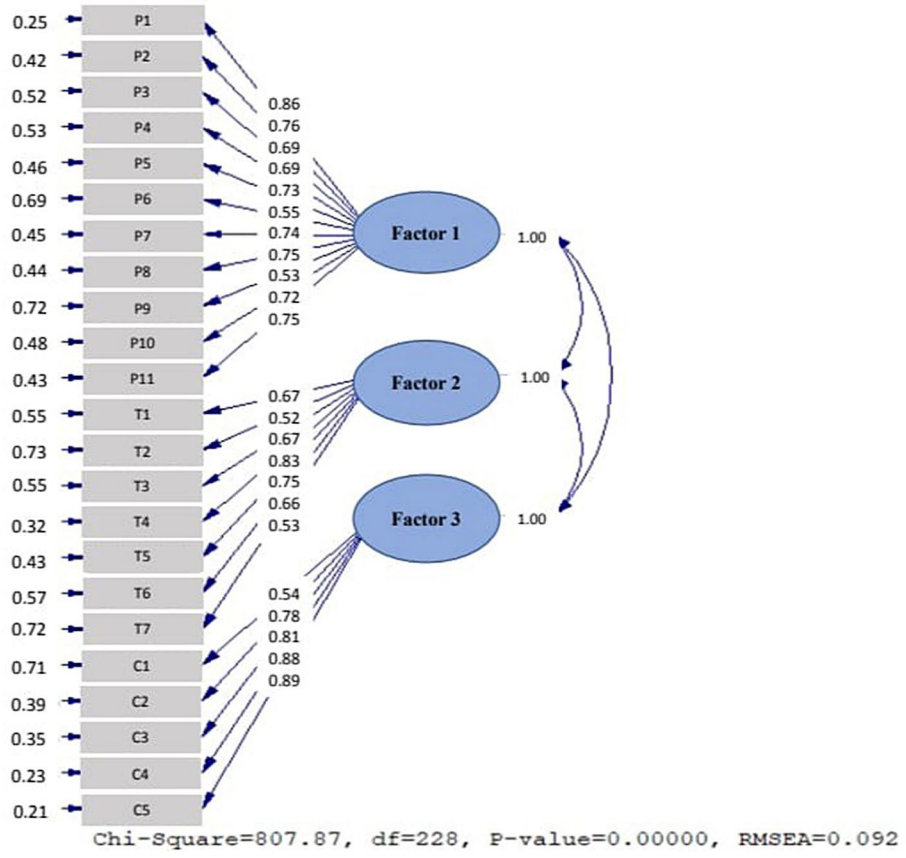

Fig. 1 Standardized model of the SANAEI

Table 4 SANAEI goodnes-of-fit indicate

Index	Good-fit	Acceptable-fit	Values
χ2 /df	1 ≤ χ2 /df ≤ 3	3 < χ2 /df ≤ 5	3,543
RMSEA	0 ≤ RMSEA ≤ 0.05	0.05 < RMSEA ≤ 0.10	0,092
NFI	0.95 ≤ NFI ≤ 1	0.90 < NFI < 0.95	0,92
NNFI	0.95 ≤ NNFI ≤ 1	0.90 < NNFI < 0.95	0,93
CFI	0.95 ≤ CFI ≤ 1	0.90 < CFI < 0.95	0,94
IFI	0.95 ≤ IFI ≤ 1	0.90 < IFI < 0.95	0,94
SRMR	0 ≤ SRMR < 0.05	0.05 ≤ SRMR < 0.10	0,081
GFI	0,90 ≤ GFI < 1	0,85 ≤ GFI < 0.90	0,81

Table 5 SANAEI convergent and discriminant validity analysis

Factor	Average Varience Extracted (AVE)	Composite Reliability (CR)	Cronbach's Alpha
Factor 1	0,507	0,918	*0.822*
Factor 2	0,448	0,847	*0.937*
Factor 3	0,625	0,890	*0.885*
TOPLAM			*0.924*

coefficient was examined, and the results indicated that the correlation between the two measurements was strong and reliable ($r = 0.842$, $p < 0.001$). Furthermore, the Intraclass Correlation Coefficient (ICC) values were found to be close to 1 ($r = 0.907$, $p < 0.01$), confirming a high level of reliability (Table 6).

Discussion

To assess the validity of the scale, content validity, factor analysis, and convergent and discriminant validity were examined. Lawshe's technique was used to gather expert opinions from 15 specialists, and since the Content Validity Index (CVI) was calculated as 0.49, 27 items with a CVI below this threshold were excluded from the draft scale form [24]. Additionally, the literature states that items with a Content Validity Ratio (CVR) below zero lack content validity and should not be included in the draft scale [33, 34]. Consequently, eight more items with a CVR below zero were removed, reducing the initial

Table 6 SANAEI test-retest analysis results

	Test		Test retest		Pearson Correlation		Intraclass Corelation Coefficient (ICC)	
	Mean ± Sd	Min-Max (Median)	Mean ± Sd	Min-Max (Median)	*r*	*p*	*r*	*p*
Total Scale	3,02 ± 0,27	1–5 (3,04)	3,09 ± 0,31	1–4,14 (3,11)	0,842	0,001	0,907	0,001**

78-item item pool to 43 items after content validity analysis. For a newly developed scale, it is recommended that a pilot study be conducted with a group of 30–50 participants who are considered representative of the sample.[33] In this study, a pilot test with 50 participants was conducted, and the draft scale was found to be reliable (Cronbach's Alpha = 0.914). Moreover, item-total correlation values were analyzed, and 15 items with correlation values below 0.20 were eliminated, further reducing the number of items to 28 [35].

To evaluate the suitability of the sample size for factor analysis, Kaiser-Meyer-Olkin (KMO) coefficient and Bartlett's test of sphericity were performed. According to the literature, a KMO value between 0.90 and 1.00 is considered "excellent", while a value between 0.80 and 0.89 is considered "good".[24] The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.883, and Bartlett's test of sphericity was statistically significant ($p < 0.05$), indicating that the sample was suitable for factor analysis. In factor analysis, the number of factors to be retained is determined by Eigenvalues (Kaiser's criterion), with only factors having Eigenvalues greater than 1 being considered [24]. The analysis identified three factors with Eigenvalues above 1 (Factor 1: 1.875, Factor 2: 1.475, Factor 3: 1.007). The Varimax rotation method was used to determine which scale items aligned best with each factor. The first factor explained 22.986% of the total variance, the second factor 17.848%, and the third factor 15.901%, resulting in a total variance explanation rate of 56.734%. These findings indicate that the total variance explained is sufficient for the scale [24, 35].

In EFA, a higher percentage of explained variance reflects a stronger factor structure, with an acceptable range typically between 40% and 60% [24, 36]. Based on the EFA results, five items (items 21, 28, 29, 32, and 57) with factor loadings below 0.40 were removed from the scale. Following this refinement, the Scale for Assessing Nurses' Approaches to Ethical Issues comprised 23 items grouped into three subdimensions (see Supplementary Table 2). The items in each subdimension were conceptually evaluated and named as "Hesitant Approach", "Indifferent Approach", and "Professional Approach". The findings were then tested using Confirmatory Factor Analysis (CFA). The results indicated that the structural equation model of the scale was statistically significant ($p = 0.000$), and that all 23 items were meaningfully associated with the overall scale structure. Within the measurement model, the standardized regression coefficients for the item-factor relationships (represented by unidirectional paths) were examined, with all factor loadings exceeding 0.40 [24, 36]. According to the CFA results, the factor loadings for the subdimensions varied as follows: Professional Approach (0.53–0.86), Indifferent Approach (0.52–0.83), and Hesitant Approach (0.54–0.89) (Fig. 1).

According to the CFA results, the factor loadings for the subdimensions varied as follows: Professional Approach (0.53–0.86), Indifferent Approach (0.52–0.83), and Hesitant Approach (0.54–0.89) (Fig. 1).

To assess the relationship between the observed data and the expected structure, fit indices were examined. The results indicated a Chi-square/df (χ^2/df) value of 3.54, which falls within the acceptable range of $3 < \chi^2/df \leq 5$. The Root Mean Square Error of Approximation (RMSEA) was 0.092, within the acceptable range of $0.05 < RMSEA \leq 0.10$. The Normed Fit Index (NFI) and Non-Normed Fit Index (NNFI) were found to be 0.92 and 0.94, respectively, both meeting the accepted criteria of $0.90 < NFI < 0.95$ and $0.90 < NNFI < 0.95$. The Standardized Root Mean Square Residual (SRMR) was 0.081, falling within the acceptable range of $0.05 \leq SRMR < 0.10$. The Comparative Fit Index (CFI) was 0.94, and the Incremental Fit Index (IFI) was also 0.94; both values fall within the acceptable range of 0.90 to 0.95.

The Goodness of Fit Index (GFI) was calculated as 0.81, which is slightly below the commonly accepted range of $0.85 \leq GFI < 0.90$, but remains within a reasonable threshold [24, 36]. With the exception of the GFI, all other fit indices indicated an acceptable model fit, supporting the statistical significance and validity of the CFA results [37]. While some sources suggest that a GFI value above 0.90 is ideal, others report that a GFI exceeding 0.80 can also be considered acceptable, as no universally established minimum threshold exists [38, 39]. In this context, the GFI value of 0.81 observed in this analysis is deemed acceptable.

To assess the extent to which the items on the scale consistently represent the same underlying construct, convergent and discriminant validity analyses were conducted. For convergent validity, a Composite Reliability (CR) value of ≥ 0.60 and an Average Variance Extracted (AVE) value of ≥ 0.50 are generally expected. Additionally, CR should exceed AVE to further support construct reliability [40]. However, when AVE is below 0.50, a CR value greater than 0.60 is considered sufficient to establish convergent validity [41–43]. Based on the AVE analysis for the subdimensions, the values were found to be 0.507 for Professional Approach, 0.448 for Hesitant Approach, and 0.625 for Indifferent Approach. The CR values were 0.918 for Professional Approach, 0.874 for Hesitant Approach, and 0.890 for Indifferent Approach. These findings indicate that the scale demonstrates adequate convergent and discriminant validity.

To assess the reliability of the scale, internal consistency analysis, item analysis, and test-retest analysis were performed. A Cronbach's Alpha value of 0.80 or higher indicates a high level of reliability [24]. After internal consistency analysis, the Cronbach's Alpha values for the subdimensions were 0.822 for Professional Approach,

0.937 for Hesitant Approach, and 0.885 for Indifferent Approach, with an overall Cronbach's Alpha value of 0.924. These results confirm that the scale used in this study has a high level of reliability.

To assess the alignment of each item with the overall scale, item analysis was conducted. An item is considered to adequately represent the scale if its correlation with the overall scale is above + 0.30; items that do not meet this criterion should be removed [24, 36]. The item correlation analysis results indicated that all correlation values exceeded + 0.30, confirming that each item effectively represents the overall scale. When examining the correlation of items with their respective subdimensions, the correlation ranges were found to be 0.820–0.916 for Factor 1 - Professional Approach, 0.883–0.918 for Factor 2 - Hesitant Approach, and 0.905–0.917 for Factor 3 - Indifferent Approach. Additionally, removing any item from the scale did not improve the Cronbach's Alpha value, demonstrating that each item contributes to the scale's reliability. The variance analysis results showed significant differences between measures ($p = 0.001$; $p < 0.05$) while confirming that the scale has additivity ($p = 0.154$; $p > 0.05$). The upper-lower group item analysis further confirmed that all items in the scale were statistically significant ($p < 0.05$) and possessed strong discriminative properties regarding the subject of study.

To assess the scale's stability over time, test-retest reliability was examined. The results indicated that the Pearson correlation coefficient was 0.842 ($p < 0.001$), and that the Intraclass Correlation Coefficient (ICC) was 0.907, which confirmed that the scale maintains high reliability over time.

Limitations

One of the limitations of this study is that permission could not be obtained from private hospitals. As a result, nurses working in private hospitals were not included in the sample, which constitutes a limitation of the research. Another limitation of the study is that participation was limited to those individuals who voluntarily agreed to take part, and that an equal distribution of male and female participants could not thus be achieved.

Conclusion

Based on the validity and reliability analyses conducted in this study, the "Scale for Assessing Nurses' Approaches to Ethical Issues" was determined to be a valid and reliable measurement tool. The final version of the scale consists of 23 items categorized into three subdimensions: Professional Approach (11 items), Hesitant Approach (7 items), and Indifferent Approach (5 items). This scale can be utilized to assess how nurses approach ethical issues and may inform the development of interventions that promote high-quality nursing care grounded in ethical principles. Nurse educators can also use the scale to design and implement more effective ethics education, thereby enhancing nursing students' capacity to address ethical issues appropriately. It is recommended that future studies employ this scale to investigate the relationship between nurses' ethical approaches and patient outcomes.

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Author contributions

Study Design: ND, EÇ. Data Collection: EÇ. Data Analysis: ND, EÇ. Study Supervision: ND. Manuscript Writing: ND, EÇ. Critical Revisions for Important Intellectual Content: ND.

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Data availability

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

Ethical approval for the study was obtained from the Non-Interventional Clinical Research Ethics Committee of Osmangazi University (E-25403353-050.99-327038, May 11, 2022). Subsequently, institutional permissions were obtained from Eskişehir Yunus Emre State Hospital and Eskişehir City Hospital through the Eskişehir Provincial Health Directorate (E-11202945-605.01, July 7, 2022), as well as from Eskişehir Osmangazi University Health Practice and Research Hospital (E-31186237-300-370867, August 17, 2022). All research activities were carried out in full compliance with the ethical standards outlined in the Declaration of Helsinki. In this study Human Ethics and Consent to Participate declarations: not applicable. Participation in the study was voluntary, and both verbal and written informed consent was obtained from all participants for both phases of the study.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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