Developing an instrument to measure nursing students' attitudes towards nurses during clinical practice: A quantitative study

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ABSTRACT

Aim: This study was conducted to develop a valid and reliable measurement tool to determine nursing students' attitudes towards nurses during the clinical practice.

Background: Nurses affect the clinical practice process of nursing students and play an important role in the latter gaining experience. Evaluation of students' attitudes towards nurses is a critical factor for the training of qualified nurses.

Design: This study used a quantitative cross-sectional design.

Methods: This study was conducted between February and March 2024 with 408 students studying in the nursing department of a university in Türkiye. The item pool of the scale was formed with 45 items through literature review and qualitative data analysis and presented to 21 experts. After the content validity, the draft scale consisting of 38 items was used as a data collection tool. Lawshe's Content Validity Ratio, Kaiser-Mayer-Olkin Coefficient, Bartlett's test, Exploratory Factor Analysis, Principal Component Analysis, Varimax Factor Rotation Method, Confirmatory Factor Analysis, Cronbach's Alpha Internal Consistency Coefficient, Spearman Correlation Coefficient and Wilcoxon Signed Ranks tests were used to analyze the data.

Results: Exploratory factor analysis revealed 28 items and three sub-dimensions in the scale. Cronbach's alpha internal consistency coefficient was 0.902 for the cooperation and understanding sub-dimension, 0.925 for the communication skills and guidance sub-dimension, 0.723 for the support for professional development sub-dimension and 0.946 for the total scale. According to the confirmatory factor analysis fit index results of the scale, RMSEA value was 0.054 and $\chi2/df$ value was 2.189. As a result of the analysis conducted to determine the test-retest reliability, it was determined that all items and factor scores showed significant relationships between the two applications ($p<0.001$).

Conclusions: The scale was found to be a valid and reliable measurement tool that can be used to determine nursing students' attitudes towards nurses during the clinical practice.

1. Introduction

Clinical practice is a process where nursing students transform their theoretical knowledge into practical skills and gain real experience in healthcare settings (Berndtsson et al., 2020). This process shapes students' professional identities, strengthens their ethical values and improves the quality of care they provide to patients. It also provides students with the experience of developing critical skills such as critical thinking, analysis, collaboration, communication and leadership. These experiences enhance success in post-graduation professional life and the safety and quality of the health system (Pitkänen et al., 2018; Vizcaya-Moreno et al., 2018). Therefore, the effective participation of

nursing students in the clinical practice process is of great importance for both the individual development of students and the quality of health services (Polat et al., 2018).

In the clinical practice process, the role of nurses on students is of vital importance. Nurses help students transform theoretical knowledge into practical experience by observing and guiding them in the clinical setting (Aydın et al., 2017). In this process, nurses support students in developing their clinical skills by providing direct observation and guidance (McSharry and Lathlean, 2017). At the same time, they emphasize the importance of ethical values and professional standards while teaching students the skills to provide appropriate care to patients. In this way, nursing students' self-confidence increases, their professional identity is shaped and they become competent health professionals (Tuomikoski et al., 2020).

Students' attitudes towards nurses in the clinical practice process are extremely important for the professional development and positive clinical experience of nursing students (Rezakhani Moghaddam et al., 2020). A positive attitude can enable students to learn more effectively in the clinical setting, while a negative attitude can lower self-confidence and motivation (Brown et al., 2012; Mattila et al., 2010). While students' positive attitude towards clinical nurses may help to develop collaboration and communication skills, negative attitude may complicate student-nurse relations and prevent students from fully benefiting from their clinical experience (Özsaban and Bayram, 2020). Therefore, nursing students' positive and supportive attitudes towards clinical nurses may enable them to benefit from the clinical practice process in the best way and maximize their professional development (Aragaw et al., 2019).

Since there exist no comprehensive scale development studies focusing on nursing students' attitudes towards nurses in the clinical practice process in the existing literature, this study will fill the gap in the field. It will contribute to a better understanding of the relationship between students and nurses in the clinical practice process and to identify strategies to improve this process. The use of this scale may be a valuable tool to optimize the clinical experiences of nursing students and to provide qualified nursing graduates. It may also contribute as an important guide in shaping the content and practices of nursing education programs. Therefore, this study aimed to develop a valid and reliable scale to determine nursing students' attitudes towards nurses during the clinical practice.

2. Methods

2.1. Study design and procedure

This study used a cross-sectional design. The diagram showing the development process of the scale is provided in Fig. 1.

2.2. Conceptual framework

The conceptual framework of the scale development study focused on assessing nursing students' attitudes towards nurses in the clinical practice process. This framework creates a structure to emphasize the importance of students' interactions with nurses in clinical settings during the nursing education process and to understand the effects of nurses on students' educational and professional development. In line with this conceptual framework, both literature review and qualitative

data analysis results were used. In the literature review, studies that could contribute to the scale items were examined to determine the basic concepts in this field (Aydın et al., 2017; Bayulgen and Uysal, 2022; Biçer et al., 2015). For qualitative data analysis, individual interviews were conducted with three nurse academics and two academics working in the department of educational sciences, at the faculty of education. In addition, focus group interviews were conducted with two undergraduate nursing students and four graduate nursing students. The data obtained were analyzed using inductive content analysis (Kyngäs, 2020). Based on the conceptual framework of the study, 45 preliminary items were created in 5-point Likert type (Strongly Disagree, Disagree, Indecisive, Agree, Strongly Agree).

2.3. Content validity

The Lawshe method was used to ensure the content validity of the research. This method is a technique where experts evaluate the relevance of each item of the measurement tool to the relevant subject or field (Romero Jeldres et al., 2023). The preliminary items were submitted to expert opinion and two rounds of content validity assessment were conducted. The experts consisted of twenty-one persons in total, including eight academic nurses, three academicians working in the department of educational sciences at the faculty of education, four specialist nurses actively working in the clinic and six graduate nursing students. For the evaluation of each measurement item, the researchers created an evaluation form consisting of the statements "necessary and should remain in the item pool", "useful but should be revised" and "unnecessary". In addition, a column was added for the experts who marked "useful but should be revised" to add explanations and suggestions. The form created to assess content validity was sent to the experts via e-mail. Based on the feedback from the experts, revision suggestions for each measurement item were examined and necessary adjustments were made. Seven items that were similar and did not measure attitudes were removed. In the next step, the revised form consisting of 38 items was sent to the experts again and they were asked to re-evaluate it. After the final expert opinions, the Content Validity Ratio (CVR) for each item and the Content Validity Index (CVI) for the overall scale were calculated. According to the Lawshe technique, it is reported that the corresponding CSV of the scale items should be at least 0.42 at α=0.05 significance level for 21 experts (Yesilyurt and Capraz, 2018). It was determined that the CVR values of all the preliminary items were above this ratio and that the scale items provided content validity (min. CVR: 0.85, max CVR: 1.0). In addition, the CVI for all scale items was calculated as 0.97. Finally, the scale items were presented to three language experts to be evaluated in terms of language and meaning and necessary corrections were made in line with their suggestions. The final version of the scale consisting of 38 items was created using a five-point Likert-type format (strongly disagree (1 point), disagree (2 points), indecisive (3 points), agree (4 points), strongly agree (5 points)). All items were positive except items 22–28 (7 items) which were reverse coded.

2.4. Sample characteristics

The study population consisted of 1178 students studying in the Nursing Department of a state university in Turkey during the 2023–2024 academic year. Nursing students studying at the school where institutional permission was obtained start clinical practice in the

Fig. 1. Scale development process.

second semester of the first year. Clinical practice continues to increase in each academic year until graduation. In the last year, students exclusively attend clinical practice. For this reason, considering that the students included in the study should have clinical practice experience, students studying in the first year were excluded from the study. In sample selection, it was aimed to reach the entire population. In scale validity and reliability studies, it is reported that at least 10 times the number of items ($38 \times 10 = 380$) and at least 10 % of the accessible population size (therefore at least 117 for this study) should be reached (Pallant, 2020). In the data collection process, it was aimed to reach a similar proportion of students from the second, third and fourth grades and a total of 408 students were included in the study. The inclusion criteria of the participants were as follows: 1) actively continuing their nursing education, 2) having previous hospital practice experience, 3) signing the informed consent form and 4) completing the data collection forms completely.

2.5. Data collection procedures

The research data were collected between February and March 2024. A six-question Descriptive Characteristics Information Form including the characteristics of the students and the draft items of the 38-question scale, were used to collect the data. The data were collected by the researchers through face-to-face interviews. The researchers informed the students about the study before the lesson by obtaining permission from the institution administrators and the responsible academician of the relevant lesson. Students who agreed to participate in the study were asked to sign a written informed consent form and given a data collection form. The data collection form was introduced to the students and they were asked to complete the form, which took 5–10 minutes, at a convenient time during the day. The completed forms were collected by the class representatives at the end of the day and delivered to the researchers in a sealed envelope. For the reliability analysis of the draft scale, a test-retest analysis was conducted and for this purpose, 55 randomly selected students were asked to fill out the draft scale again, approximately one month later (Streiner et al., 2016).

2.6. Data analysis

Statistical data analysis was performed using the IBM SPSS Statistics 26.0 package program (IBM Corp., Armonk, New York, USA). Descriptive statistics are given as frequency (n), percentage (%), Mean ± Standard Deviation, minimum value (min) and maximum value (max). The normal distribution of the data of the numerical variables was evaluated by the Shapiro-Wilk normality test and Q-Q graphs. Content validity ratios were calculated for content validity. Construct validity, criterion-related validity, internal consistency reliability, test-retest and item analysis methods were used for the nursing students' attitudes towards nurses in the clinical practice process. Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were conducted on the data obtained for construct validity. In order for exploratory factor analysis to be applied to a data group, the data must be suitable for factor analysis and the sample must be sufficient (Özdamar, 2013). First, the results of Bartlett's Test of Sphericity for Factorability and Kaiser-Meyer Olkin (KMO) test for the adequacy of the number of units in the sample were examined. The reason for conducting EFA is to test the theory about the nature of the process and to make an operational definition of the basis of the process using the observed variables (Tabachnick and Fidell, 2014). A structure consisting of three factors was obtained through EFA, principal components approach and varimax rotation method. Cronbach's alpha value was calculated for internal consistency reliability testing. The relationship between the total score and the scores of the sub-dimensions of the nursing students' attitude scale towards nurses in the clinical practice process was evaluated using the Spearman correlation analysis. Confirmatory Factor Analysis was performed using the IBM AMOS 23 package program. The reason for

using CFA is to test whether there is a fit between the variables that play a role in determining the theoretical factors and the original variables that make up the factors determined by EFA (Özdamar, 2013). While evaluating the CFA fit indices, χ2/df, SRMR (Standardized Root Mean squared Residual), RMSEA (Root Mean Square Error of Approximation), CFI (Comparative Fit Index), GFI (Goodness of Fit Index), AGFI (Adapted Goodness of Fit), NFI (Normed Fit Index) and NNFI (Non-Normed Fit Index) values were used. A value of $p < 0.05$ was considered statistically significant.

2.7. Ethical considerations

To conduct the study, ethics committee approval was obtained from the Ethics Committee of Kayseri University with the date 09.02.2024 and number 89096 and institutional permission was obtained from the school where the study was conducted. The purpose of the study was explained to all students participating in the study before data collection and they were informed that the data obtained from the study would be kept confidential and used only for scientific purposes. Students were also asked to sign a written informed consent form. The principles of the Declaration of Helsinki were carefully followed at every stage of the study.

3. Results

3.1. Characteristics of participants

Descriptive characteristics of the students included in the study are given in Table 1. It was reported that 38.5 % of the students were in the fourth year, 80.6 % were female, 60.0 % had a general academic grade point average between 2 and 3, 5.9 % graduated from health vocational high school and 62.7 % declared nursing as their preferred choice of career. In addition, the mean age of the students was 21.28 (SD 1.48) years.

3.2. Reliability analysis

Statistical data on the reliability coefficients of the scale is provided in Table 2. In the literature, a Corrected Item-Total Correlation value of >0.40 is recommended (Devon et al., 2007). Therefore, items with <0.40 values were removed from the study step by step and only items with >0.40 values were retained. Statistics for the remaining items are given in the last step.

Table 1
Descriptive Characteristics of Participants (n=408).

Characteristics	Statistics
Academic year, *n* (%)	
Second year	134(32.8)
Third year	117(28.7)
Fourth year	157(38.5)
Age (year)†	21.28±1.48
	(19–32)
Gender, *n* (%)	
Female	329(80.6)
Male	79(19.4)
General academic Grade Point Average (in a system of 4), *n* (%)	
2–3	345(60.0)
3–4	163(40.0)
The school they graduated from, *n* (%)	
Health vocational high school	24(5.9)
Other	384(94.1)
Was nursing their preferred career choice, *n* (%)	
Yes	256(62.7)
No	152(37.3)

n: number of participants, %: percentage value, †: Mean±standard deviation (min-max)

Table 2
Reliability Coefficients of the Scale.

	First Step				Last Step			
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Item−1	120.1740	316.837	0.611	0.900	85.5049	311.243	0.644	0.944
Item−2	120.2279	317.090	0.657	0.899	85.5588	311.982	0.679	0.944
Item−3	120.4975	316.629	0.630	0.899	85.8284	311.459	0.652	0.944
Item−4	120.0980	318.791	0.637	0.900	85.4289	313.779	0.657	0.944
Item−5	120.4828	316.668	0.638	0.899	85.8137	311.233	0.667	0.944
Item−6	120.3235	320.347	0.533	0.901	85.6544	313.927	0.588	0.945
Item−7	120.1569	318.378	0.670	0.899	85.4877	312.020	0.732	0.943
Item−8	120.2696	318.350	0.667	0.899	85.6005	312.609	0.709	0.943
Item−9	120.0613	317.753	0.639	0.899	85.3922	311.979	0.680	0.944
Item−10	119.5294	322.554	0.532	0.901	84.8603	319.757	0.485	0.946
Item−11	119.3113	325.394	0.503	0.902	84.6422	322.884	0.442	0.946
Item−12	119.1642	328.172	**0.380**	0.903	-	-	-	-
Item−13	120.6201	318.428	0.614	0.900	85.9510	312.602	0.656	0.944
Item−14	120.1569	316.447	0.638	0.899	85.4877	312.191	0.636	0.944
Item−15	120.3235	317.733	0.660	0.899	85.6544	311.907	0.704	0.943
Item−16	120.0686	320.654	0.589	0.900	85.3995	314.791	0.633	0.944
Item−17	119.9461	317.574	0.708	0.899	85.2770	312.682	0.725	0.943
Item−18	119.2721	324.533	0.438	0.902	-	-	-	-
Item−19	119.1667	329.083	**0.373**	0.903	-	-	-	-
Item−20	119.1275	331.055	**0.320**	0.904	-	-	-	-
Item−21	119.7623	318.762	0.632	0.900	85.0931	315.760	0.593	0.945
Item−22	120.3995	347.788	**−0.161**	0.911	-	-	-	-
Item−23	120.6005	347.739	**−0.156**	0.912	-	-	-	-
Item−24	120.5098	353.725	**−0.296**	0.913	-	-	-	-
Item−25	119.5196	343.833	**−0.069**	0.910	-	-	-	-
Item−26	119.4216	343.026	**−0.050**	0.910	-	-	-	-
Item−27	121.4093	354.749	**−0.364**	0.913	-	-	-	-
Item−28	120.4730	358.825	−0.437	0.914	85.8039	357.234	−0.510	0.956
Item−29	120.2353	318.913	0.614	0.900	85.5662	313.460	0.645	0.944
Item−30	119.9608	319.969	0.614	0.900	85.2917	314.497	0.647	0.944
Item−31	120.2819	317.721	0.615	0.900	85.6127	312.321	0.644	0.944
Item−32	120.1593	315.830	0.644	0.899	85.4902	309.735	0.691	0.944
Item−33	120.1029	316.486	0.681	0.899	85.4338	310.335	0.733	0.943
Item−34	120.4436	320.159	0.567	0.900	85.7745	313.615	0.629	0.944
Item−35	120.3137	319.926	0.555	0.901	85.6446	313.036	0.625	0.944
Item−36	120.2990	316.991	0.630	0.899	85.6299	310.224	0.696	0.944
Item−37	120.0784	316.888	0.647	0.899	85.4093	310.911	0.692	0.944
Item−38	120.1127	316.321	0.674	0.899	85.4436	311.294	0.693	0.944

3.3. Exploratory and confirmatory factor analysis

According to ANOVA with Tukey's test for non-additivity analysis, it is seen that the scale has a summable structure (F=49.96, p<0.001). Kaiser Meyer Olkin sampling adequacy was above 0.5 (KMO=0.960) and Bartlett's test of sphericity was significant (χ2=6903.45; p<0.001). It is seen that the scale has a factorizable structure. Principal component analysis and varimax rotation method were applied as factor extraction method and rotated factor loadings were obtained in Table 3. When the line graph based on the eigenvalues of the factors in Table 3 and Graph 1 is analyzed, it is seen that the 28 items consist of three components. The total variance explained by the three components is 57.48 %. The rotated factor loadings obtained as a result of the Varimax rotation method are provided in Table 3. When the items related to the sub-factors of the scale were examined, the first factor was defined as "cooperation and understanding", the second factor as "communication skills and guidance" and the third factor as "support for professional development". Cronbach's alpha values were 0.902 for the first factor, 0.925 for the second, 0.723 for the third and 0.946 for the total scale. The fit indices of the model as a result of CFA are provided in Table 3; they highlight the acceptable limits of fit. Concerning these limits, the path diagram and standardised coefficients of the model obtained by creating three factors as well as the results of the path diagram, are both provided in Fig. 2. When the model fit indices were analysed within the limits of fit in Table 3, acceptable fit was obtained in terms of RMSEA and χ2/df and values close to the threshold limit were obtained in terms of other fit criteria; an acceptable fit was found when the scale was evaluated in terms of model fit indices (Harrington, 2009; Kline, 2023;

Marsh et al., 2006; Schermelleh-Engel et al., 2003).

3.4. Relationship between the total scale score and subscales

The correlation coefficients between the total score of the scale and the sub-dimensions are stipulated in Table 4. A strong positive correlation was found between Factor 1 and total score (*rho*=0.955; p<0.001) and between Factor 2 and total score (*rho*=0.892; p<0.001). A moderate positive significant relationship was found between Factor 3 and total score (*rho*=0.668; p<0.001), Factor 1 and Factor 2 (*rho*=0.744; p<0.001), as well as Factor 1 and Factor 3 (*rho*=0.615; p<0.001). A low positive significant relationship was found between Factor 2 and Factor 3 sub-dimension scores (*rho*=0.487; p<0.001).

3.5. Reliability analysis

According to Table 5, it was found that the first and second measurements showed significant relationships for Factor-1, Factor-2, Factor-3 and total scores and there was similarity between the first and second scores obtained from the scale (p<0.05). There was a high level of agreement between the first and second measurements in ICC values. In addition, the Cronbach's alpha value of the scale was found to be 0.927 in the analysis performed with the test-retest method. According to these findings, it is seen that the scale is reliable.

4. Discussion

The scale of 'Nursing Students' Attitudes Towards Nurses During

Table 3
Summary results of Exploratory Factor Analysis and Confirmatory Factor Analysis.

		Factor 1	Factor 2	Factor 3	% of variance explained	Cronbach's alpha
Item−5	Nurses are willing to guide students.	0.733			46.359	0.901
Item−3	Nurses allocate sufficient time to students during clinical practice.	0.729				
Item−7	Nurses are helpful to students.	0.725				
Item−6	Nurses treat students fairly.	0.686				
Item−13	Nurses are willing to work with students in clinical practice.	0.667				
Item−8	Nurses are understanding toward students.	0.655				
Item−4	Nurses work in co-operation with students.	0.619				
Item−15	Nurses have an open attitude towards communication.	0.616				
Item−17	Nurses support my ability to gain experience about practices.	0.572				
Item−1	Nurses respect students as a future member of the profession.	0.571				
Item−16	Nurses give me the opportunity to ask questions about the issues I am curious about.	0.524				
Item−2	Nurses provide constructive criticism to students.	0.512				
Item−14	Nurses make me feel as a part of the team.	0.497				
Item−9	It is pleasant to work with nurses in the clinic.	0.488				
Item−28	Nurses do not defend my rights against other professional groups in the team.*	−0.466				
Item−36	Nurses guide students in dealing with ethical problems.		0.765		6.545	0.925
Item−34	Nurses guide students on strategies for coping with stress that they may encounter in the clinical environment.		0.758			
Item−32	Nurses support my ability to communicate with patients.		0.748			
Item−37	Nurses set an example with their own behaviours for students to develop a professional identity in accordance with ethical values.		0.718			
Item−31	Nurses contribute to the students' career planning.		0.716			
Item−29	Nurses help me to improve my skills to cope with stressful situations I encounter during clinical practice.		0.677			
Item−38	Nurses guide students on effective working skills in a multidisciplinary team.		0.653			
Item−33	Nurses interact with students with a respectful attitude.		0.641			
Item−30	Nurses are pleased to share their professional experiences with students.		0.637			
Item−35	Nurses treat students equally and fairly and provide equal opportunity to each of them.		0.613			
Item−11	The responsibilities given by nurses make me feel more competent.			0.800	4.582	0.723
Item−10	Nurses' feedback plays an important role in my professional development.			0.751		
Item−21	Nurses contribute positively to my clinical practice process.			0604		
Total					57.486	0.946
Fit indices	X^2/df (p)	RMSEA	SRMR	CFI	GFI	NFI
Reference value	<3 (<0.05)	≤.08	≤.08	≥.90	≥.85	≥.90
Model	2.189 (<0.001)	0.054	0.0396	0.940	0.885	0.895

Factor 1: Cooperation and understanding, Factor 2: Communication skills and guidance, Factor 3: Support for professional development
Subtraction method: Principal Component analysis, Rotation method: Varimax, Rotation was combined after 6 iterations, * Reverse item
X^2/df: Chi-squared/degrees of freedom, RMSEA: Root means square error of approximation, SRMR: Standardized root mean squared residual, CFI: Comparative fit index, GFI: Goodness of-fit, NFI: Normed fit index
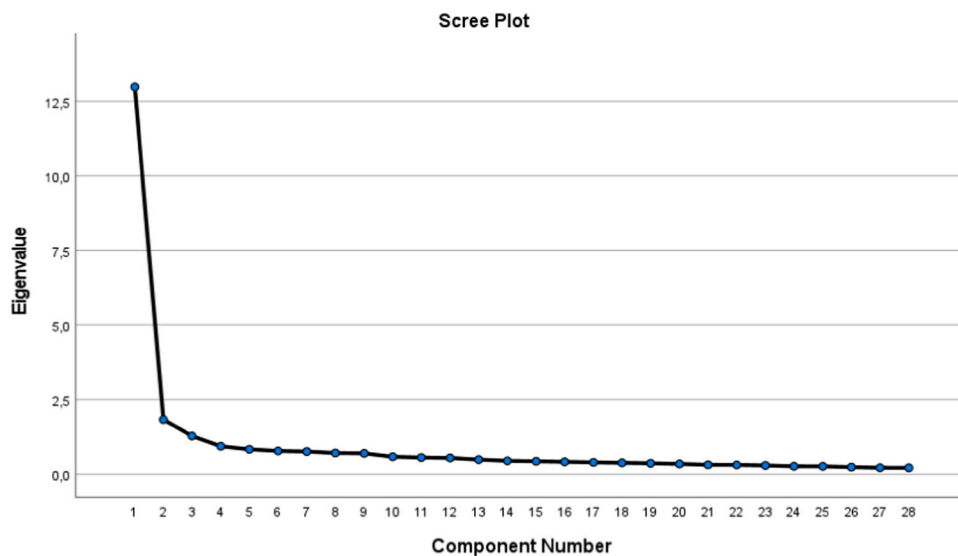
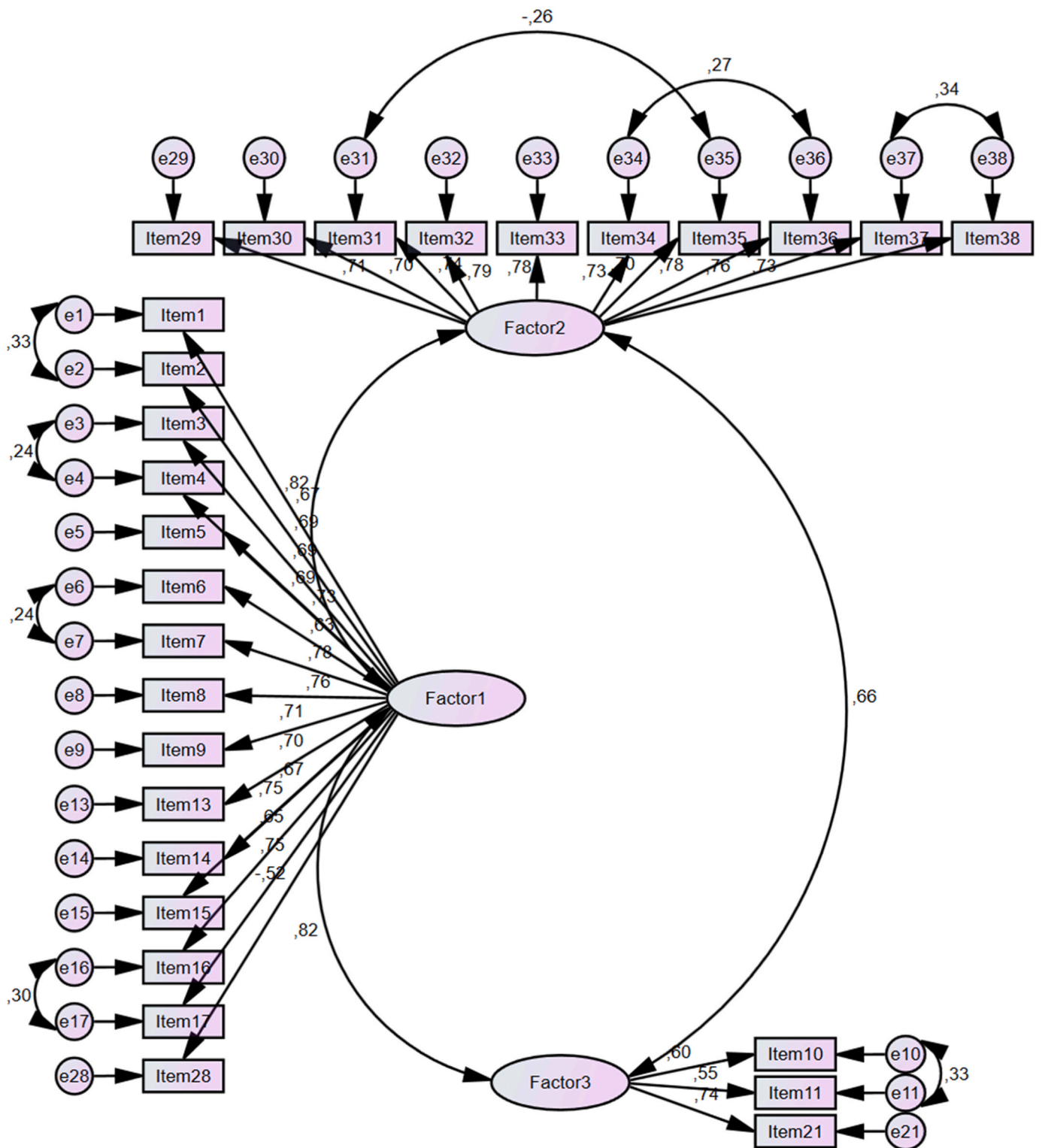**Graph 1.** Line graph based on eigenvalues of factors.

Fig. 2. Path diagram (Standardized estimates).

Clinical Practice' was developed to fill an important gap in the field of nursing education and to make an important contribution to the literature. When the existing literature on the subject was examined, no study evaluating students' attitudes towards nurses in the clinical practice process was found. The development of this scale will make it possible to evaluate students' clinical experiences with nurses more effectively by providing a comprehensive evaluation tool for nursing education. As a result of the analysis of the data obtained, a scale consisting of three factors and twenty-eight items was developed to measure nursing students' attitudes towards nurses in the clinical practice process.

Content validity is a concept used to determine how accurately each item and the total of the scale reflects the targeted characteristics (Younas and Porr, 2023). In this study, the Lawshe technique was used to determine content validity, where the number of qualified experts is expected to be between 5 and 40 (Ayre and Scally, 2014; Morgan et al., 2019); expert opinions were obtained from twenty-one experts for

Table 4
Examination of the Relationship between the Total Scale Score and Subscales.

		Total	Factor 1	Factor 2
Factor 1	rho	0.955[**]	-	-
	p value	<0.001	-	-
Factor 2	rho	0.892[**]	0.744[**]	-
	p value	<0.001	<0.001	-
Factor 3	rho	0.668[**]	0.615[**]	0.487[**]
	p value	<0.001	<0.001	<0.001

Factor 1: Cooperation and understanding, Factor 2: Communication skills and guidance, Factor 3: Support for professional development, rho: Spearman correlation coefficient
** Correlation coefficient is significant at 0.01 level (2-way).

content validity of the draft scale items. In addition, within the framework of the Lawshe technique, it is emphasised that the CVR value corresponding to the α=0.05 significance level of the scale items with the participation of twenty-one experts should be at least 0.42 (Yesilyurt and Capraz, 2018). As a result of the calculations, it was considered that there was a consensus among the experts and content validity was ensured since the scale items had a minimum CVR of 0.85 and the CVI was calculated as 0.97.

Item analysis is an analytical method used to examine the relationship between test items and the overall performance of the test (Morgan et al., 2019). In the literature, a Corrected Item-Total Correlation value of >0.40 is recommended (Beavers et al., 2019). According to this data, ten items with item-total score correlation below 0.40 were removed from the scale. The item-total score correlation coefficients of the remaining twenty-eight items were found to have load values in the range of 0.442–0.732. The fact that the item-total score is significantly high indicates that the items in the measurement tool effectively measure similar behaviours (Pallant, 2020). In particular, the fact that the overall item-total correlation has values of 0.40 and higher emphasises that the items of the scale are compatible with the total score and accurately reflect the investigated feature (Beavers et al., 2019). The fact that the item correlation coefficients in this study are above 0.40 reveals that the scale items have discriminative properties.

Factor analysis is a multivariate statistical technique and aims to determine the underlying structure of a set of observed variables (Karaman et al., 2017). First of all, for the factor analysis, Kaiser-Meyer-Olkin (0.96) and Barlett (p<0.001) test analyses were performed and it was proved that the sample size was sufficient, according to the values stated in the literature (Williams et al., 2010). In the factor analysis technique, axis rotation is used to investigate the clarity and significance of the factors and the explained variance ratio is generally expected to be at least 30 % in multidimensional scales (Pallant, 2020). A total variance between 40 % and 60 % indicates that the factors satisfactorily explain the measured variables and that the internal structure of the scale is reliable (Carpenter, 2018). As a result of the rotation process performed in this study, it was determined that twenty-eight items, explaining 57.48 % of the total variance, were grouped into three sub-dimensions. When the items under the

sub-dimensions of the scale were examined, the first factor was named as "cooperation and understanding", the second factor as "communication skills and guidance" and the third factor as "support for professional development". The Cronbach's alpha values of the scale (0.946) and the factors (respectively: 0.901, 0.925, 0.723) were quite high. Considering that the reliability coefficient is above 0.70 in the literature, it can be said that the reliability coefficient of the total items and sub-dimensions of the developed scale is quite high and the scale is reliable (Pallant, 2020).

Confirmatory factor analysis is used to verify the fit of the model with the factors and is performed to determine whether the sub-dimensions determined to evaluate the construct validity of the draft scale in scale development studies, are statistically confirmed (Brown, 2015; Kartal and Bardakçı, 2018). As a result of the Confirmatory Factor Analysis, the fit indices of the model (χ2/df, p, RMSEA, SRMR, CFI, GFI, NFI) were examined by considering the reference ranges accepted in the literature (Harrington, 2009; Kline, 2023; Marsh et al., 2006; Schermelleh-Engel et al., 2003). As a result of the analyses, it is seen that there is an acceptable fit in terms of RMSEA and χ2/df criteria. When other fit criteria were analysed, values close to the threshold limit were obtained. When the scale was evaluated in terms of model fit indices, an acceptable fit was found.

One of the methods frequently used in reliability analyses is the test-retest method (Yaslioglu, 2017). Test-retest reliability is used to evaluate the consistency of a measurement tool over time. In this analysis, the same test is administered to the same group of individuals after a specific period and the correlation between the two sets of results is examined. A high correlation indicates that the measurement tool produces consistent results over time, thus demonstrating its reliability. Test-retest reliability is particularly important for assessing scales designed to measure characteristics that are not expected to change over time, such as intelligence or personality. This method namely helps to determine whether the measurement tool is affected by random errors (Lally and Testa, 2015). In this method, the correlation between the two measurements is aimed to be above 0.70 (Morgan et al., 2019). In this study, the test-retest method was applied for reliability analysis and it was determined that the correlation value of the first factor was 0.961, the correlation value of the second factor was 0.956, the correlation value of the third factor was 0.885 and the total item correlation value was 0.959. It was demonstrated that all items and factor scores were significant (p<0.001) between the two applications and that the scale can be used reliably.

The scale, which has proven to be a valid and reliable measurement tool, consists of 28 items and three sub-dimensions. Scoring of the scale is based on a 5-point Likert scale ranging from 1 to 5 and only the 28th item is reverse coded. The minimum score for the first factor is 15 and the maximum score is 75, the minimum score for the second factor is 10 and the maximum score is 50 and the minimum score for the third factor is 3, whereas the maximum score is 15. The minimum score that can be obtained from all scale items is 28 and the maximum score is 140. The increase in the total score obtained in the scale is considered to indicate that nursing students exhibit more positive attitudes towards nurses

Table 5
Test-Retest Results (n=55).

	First measurement Mean±SD Median (IQR)	Second Measurement Mean±SD Median (IQR)	Z	p	ICC	p
Factor 1	46.94±11.39 31 (17)	48.54±10.13 45 (15)	3.491	<0.001	0.961 (0.934–0.977)	<0.001
Factor 2	30.96±7.92 31 (11)	32.27±7.61 32 (11)	3.786	<0.001	0.956 (0.927–0.974)	<0.001
Factor 3	12.11±1.95 12 (2)	11.62±1.97 11 (2)	3.544	<0.001	0.885 (0.810–0.931)	<0.001
Total	90.01±19.97 88 (27)	92.07±16.81 90 (23)	2.757	0.006	0.959 (0.930–0.976)	<0.001

Factor 1: Cooperation and understanding, Factor 2: Communication skills and guidance, Factor 3: Support for professional development, *ICC*: Intraclass correlation coefficient, *Z: Wilcoxon Signed Ranks test*

during the clinical practice.

4.1. Limitations

This study fills an important gap in the literature in terms of improving nursing education and clinical practice by providing a scale to measure nursing students' attitudes towards nurses, during clinical practice. The scale items were constructed based on results from the literature and qualitative data from expert personnel and its validity and reliability were also confirmed. Despite these strengths, this scale has some limitations. Since it was newly developed, the results of the study are limited to the research sample. As its development process only covers nursing students studying in the second, third and fourth grades, validity and reliability analyses of the data obtained from its application to nursing students studying in the first grades should be performed. In addition, relying on the subjective experiences of the participants during the development process of the scale, may create a subjective effect on the general usability of the scale. The fact that the study was developed in a specific language and culture may also be a limitation that cannot cover different language and cultural groups. In addition, applying both EFA and CFA to the same data set to assess internal construct validity in this scale development study may constitute a limitation. These limitations should be taken into consideration in terms of interpreting the results of the study and evaluating its general validity.

5. Conclusion

Within the scope of this study, a scale was developed to determine nursing students' attitudes towards nurses during the clinical practice. The research findings show that the scale is a valid and reliable measurement tool consisting of twenty-eight items and three sub-dimensions. The findings show that the scale is an effective and appropriate tool for its purpose and that it has the potential to contribute to research in this field. The developed scale can be used to understand the clinical practice experiences of nursing students with nurses, to evaluate the effectiveness of educational programmes and to support the professional development of students.

Ethics approval statement

The Ethics Committee of Kayseri University (No: 89096, Date: 09.02.2024)

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CRediT authorship contribution statement

Ali KAPLAN: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Resources, Project administration, Methodology, Investigation, Formal analysis, Conceptualization. **Ozlem KAPLAN:** Writing – review & editing, Writing – original draft, Validation, Methodology, Investigation, Conceptualization. **Cevriye ÖZDEMİR:** Writing – review & editing, Writing – original draft, Validation, Methodology, Investigation, Conceptualization. **Busra EMIR:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Conceptualization.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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