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Research Article

KOLORTA NURSING ATTITUDE SCALE VALIDITY AND RELIABILITY STUDY

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Abstract*:* *In this study, for the purpose of determining the attitudes of nurses and nursing undergraduate students towards the nursing profession, the validity and reliability study was tried to be performed for the "Kolorta Nursing Attitude Scale." In the study, the experiment form consisting of 45 expressions was applied to a sample of 1034 participants, of which 76.3% were female, 43.4% were nurses, and 56.6% were nursing students. The scale validity and reliability study consisted of the steps of examination of the theoretical structure, obtainment of the work permit, the stage of item writing, the language and psychometric controls, the pilot application for the item selection, obtainment of an expert opinion, creation of the experiment form and its application to the sample, validity, and reliability, and finalization of the scale. The validity of the scale was determined by examining the structural validity and internal validity of the scale. Factor analysis was used to determine the structural validity, and 27% subgroup and supergroup comparison were used to determine the internal validity. In order to test the reliability of the scale, the Cronbach's alpha reliability coefficient and test-retest consistency were calculated. The developed "Kolorta nursing attitude scale" consists of 3 sub-dimensions and 23 items, and it can explain 61.6 of the total variance for nursing attitudes. The total score of the scale ranges from 23 to 115, and the increase in score means a positive attitude towards nursing. The general Cronbach's alpha reliability coefficient of the scale was calculated as .90, which indicates high reliability. According to the results, it is observed that the "Kolorta nursing attitude scale," of which validity and reliability study was performed for the purpose of measuring attitudes towards nursing, can perform measurements in a valid and reliable way.*

Keywords: *Nursing, attitudes, validity, reliability*

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1. Introduction

Nursing is a profession that succeeds in renewing itself with social-cultural and technological changes from past to present, which aims to provide care to patients and healthy individuals from every age group, families, and society, which have the ability to work with other members of the health care team, which is based on philosophy, theory, practice, and research [1], and which requires many qualities such as independent thinking, creativity, and competence [2].

Nurses, who constitute the largest group of health care workers, are the professional group that determines patient requirements, plans and applies care, and evaluates the efficacy of care, accompanies the patient for 24 hours without interruption, and at the same time ensures the coordination of health care team members [3]. Therefore, the importance of nurses in the health care team cannot be denied. However, the inadequacy of the number of nurses is a global problem, and this problem grows in parallel with the speed of nurses' leave from the profession [4-6]. Estimates suggest that this inadequacy will amount to 15 million in the 2030s [6]. Studies demonstrate that the negative attitudes of nurses towards the profession are an important factor in the inadequate number of nurses. This situation does not only affect the recruitment of new-qualified nurses, but it is also associated with the turnover of nurses and their leave from the profession [7]. Therefore, determining the attitudes of nurses and nurse candidates towards their profession becomes more important.

The attitude is a tendency to react positively or negatively to a particular object, situation, institution, concept, or other people. The attitude manifests itself with feelings, thoughts, and actions [8]. By measuring the attitudes of the health personnel, especially of nurses who spend the most time with the patient, towards their occupation, which factors influence them in their motivation for their occupation and what are their expectations from their occupation can be determined in advance [9]. Moreover, it is stated that positive attitudes towards the nursing profession have a positive effect on nurses' staying in the profession [10]. While nurses' perceptions of their profession affect how they see themselves within the community and their motivation, they can also be effective on their performance in the working life [11].

Investigation of the "attitude," which affects the motivation of nurses, their performance in the working life, as well as staying in the profession, becomes crucial. Although there are various measurement tools used in the field of nursing upon reviewing the literature, it is observed that some measurement tools were developed by ignoring the standards specified in the literature in terms of the variances and factor eigenvalues they explained. Furthermore, the high number of items of some measurement tools or quite long items constitute an essential problem for nurses who do not want to participate in scientific studies due to their intense work tempo and limited time and for researchers who conduct studies in this field. By using the nursing attitude scale developed in this study, it is aimed to meet this need and guide the related studies.

This study has a unique value in terms of developing a measurement tool, which is developed by considering the factor load and variance values proposed in the literature, which consists of a small number, short and comprehensible statements, which is practical but covers the concept fully and has a high capacity of accurate measuring.

2. Material and Methods

Study design should be implied as a methodological study. Developing the Kolorta nursing attitude scale consisted of the stages of examining the theoretical structure, ethics, permits, item writing, creating the draft form, pilot implementation, scope validity (expert opinion), creating the trial form, applying the trial form to the sample, obtaining the results (construct validity and reliability), and giving the final form to the scale.

2.1. Examination of the theoretical structure

At this stage, the literature on nursing and attitudes towards nursing was reviewed, and the conceptual framework of the subject was determined.

2.2. Ethics and permits

Ethics committee approval was obtained from the Scientific Research and Publication Ethics Board of Artvin Çoruh University (Dated 18.05.2017, session numbered 2017/3 and decision numbered 8), and institutional permission was obtained from the institutions where the data collection stage was carried out.

2.3. Creation of the question pool

This stage consisted of sub-stages such as literature review, composition writing, and focus group interview. At the stage of literature review, studies examining attitudes and opinions about the nursing profession in databases and printed sources were examined, and statements that could be an attitude were included in the question pool. At the stage of composition writing, six nurses and 45 nursing students were asked to write their feelings, thoughts, and behaviors about nursing and the nursing profession in the form of items, and statements including feelings, thoughts, and behaviors about nursing were transformed into attitude statements and added to the question pool. At the focus group interview stage, a student group consisting of 9 individuals was interviewed according to the literature recommendations [12]. After all these processes, a question pool consisting of a total of 57 statements was obtained.

2.4. Creation of the draft form

This study aimed to develop a 5-point Likert-type scale. Likert- type scales are the scales in which responses of various degrees may be given to statements according to the predetermined stimuli, criterion, or set of criteria, and which are commonly used in the tools which measure thoughts, beliefs, and attitudes by combining multiple questions of Likert type [13-15].

2.5. Pilot implementation

Prior to the studies being conducted especially with a large number of samples, being sure that the questions in the forms are understood correctly and completely by the sample is very crucial in terms of the reliability of both the data and the study. Therefore, the pilot implementation was performed in a group of 55 individuals carrying the characteristics of the sample in this study. This number is quite sufficient for pilot implementation because, in the literature, 30-50 people are stated to be sufficient for pilot implementation [16]. As a result of the implementation, it was determined that there were

statements that were not understood or were misunderstood by the sample, and by making the necessary corrections, a draft form consisting of 52 statements was obtained.

2.6. Content validity

Content validity is the deciding process about at what level the items constituting the test represent the universe of the measured behaviors; it is determined according to the expert opinion [17,18]. For assessing the content validity, the draft form, in which the necessary corrections were made after the pilot implementation, was sent to 10 experts consisting of academicians experienced in scale development, nursing, measurement and evaluation, and psychology (statistician, measurement and evaluation specialist, psychologist, nurse), and their opinions were requested. After the necessary corrections were made according to the expert suggestions, the draft form was reduced to 47 statements. Afterward, this draft form consisting of 47 statements was evaluated by experts in terms of Turkish language validity, and according to their opinions, the question form was corrected in terms of language and grammar. After the corrections, the draft form consisted of 45 statements in total.

2.7. Creation of the trial form

Statements in the draft form were arranged in the form of 1 = "I totally disagree", 2 = "I disagree", 3 = "I agree moderately", 4 = " I agree", 5 = "I agree completely", and the 45- statement trial form was obtained.

2.8. Application of the trial form to the sample

The obtained 45-statement trial form was applied to a sample of 1097 people of whom 76,3% were women, 43,4% were nurses, and 56,6% were nursing students. The sample of the study consisted of 1034 people because the participants, who filled out the trial form incompletely or who were considered to fill out the form randomly, were excluded from the study.

Two criteria were taken into consideration in determining the number of samples required for this study. One of them is the adequacy of the number of individuals to be included in the sample, and the other one is the Kaiser-Meyer-Olkin (KMO) test for determining the adequacy of the data obtained from the sample. Although there are various suggestions in the literature for the size of the sample to be taken in scale development studies [19,20], while Ho (2006) suggested that the number of samples should not fall below 100 to conduct factor analysis (p.207) [21], Comrey and Lee stated that 100 is weak, 200 is medium, 300 is good, 500 is very good, and 1000 is excellent [22]. In the evaluation of the KMO values, the KMO values close to 1 are evaluated as excellent, and the KMO values below 0.50 are evaluated as unacceptable. According to this evaluation, values around 0.50 are considered poor, 0.60 - 0.70 mediocre, 0.80 very good and 0.90 excellent [23]. In this study, the number of samples is over 1000, and the KMO value is 0.936, and these indicate that the number of samples is excellent and the data obtained from the sample are sufficient.

2.9. Validity and Reliability

Validity is the fact that the measurement tool used is appropriate to the feature desired to be measured, the data precisely reflect the quality of the feature desired to be measured, and at the same time, the data are useful for the purpose [20]. Reliability can be defined as the fact that test or scale results accurately reveal the phenomenon of conceptual structure, and that the measurement tool gives

similar results when applied in different places, at different times, and in different masses selected from the same mass [20].

In order to determine the construct validity of the scale developed to reveal attitudes towards nursing, "Principal Component Analysis," which is one of the "Exploratory Factor Analysis" techniques, was used. Exploratory factor analysis helps to collect the items in the measurement tool in certain sub-factors [24]. In factor analysis, when factors are obtained for the first time, they are not obvious, and therefore it is difficult to give meaning and interpret them since most of the variables are collected under the most significant factor with the highest load [25]. Therefore, the process of factor identifying, i.e. "rotation" is performed. At the end of the rotation, factors find items that are highly correlated with them, and as a result, the interpretation of factors becomes easier [25]. In the rotation process, "vertical rotation techniques" are used if there is no theoretical structure that requires factors to be related to each other, and "oblique rotation techniques" are used if there is a structure that requires factors to be related to each other [24,25].

In this study, since it was considered that there might be a relationship between the factors and it was desired to reveal a structure composed of theoretically interrelated factors, the "direct oblimin technique" among oblique rotation techniques was used as the factor rotation technique, and the maximum iterations for convergence were set at 15. For the internal validity of the scale, a lower-upper group comparison of 27% was made. For the reliability of the scale, Cronbach's α reliability coefficient (Cronbach's Alpha) and test-retest consistency were used.

3. Results

The results related to preliminary statistics and the validity and reliability of the scale were presented in this section.

3.1. Preliminary statistics

At this stage, firstly, the suitability of the data for factor analysis was investigated. In order to determine the suitability of the data for factor analysis, prior to factor analysis, it is recommended to check the normality assumption, to check the item reliability, to calculate the Kaiser-Meyer-Olkin (KMO) coefficient, and to perform Barlett's sphericity test [14,26].

Checking the normality assumption: In order to check the normality assumption, the data obtained from 1034 nurses and nursing students were examined, and the kurtosis and skewness values were controlled. The kurtosis and skewness values were determined to be within the acceptable limits (skewness<2, kurtosis<7) according to the literature [20].

Item reliability, i.e. the average of the item-total score correlation coefficients: It is calculating the correlation between the scores of each item and the total scores of a five- or seven-grade scale in attitude scales (indices) or of the scale/test which may be composed of double-digit values in knowledge and achievement tests [20]. If the item-total score correlation coefficient is below 0.30, it should be considered that there is a problem in the item [20], and the item should be either changed or excluded from the scale.

In the analysis, the correlation coefficient of 5 items (M_2, M_{15}, M_{32}, M_{42}, M_{43}, and M_{44}) was determined to be below 0.30, and therefore, they were excluded from the scale. The correlation coefficient of the remaining 40 items ranged from. 37 to. 75.

Kaiser-Meyer-Olkin (KMO) coefficient and Barlett's sphericity test: The KMO coefficient gives information about the suitability of the data matrix for factor analysis and the suitability of the data structure for factor extraction. The KMO is expected to be higher than. 60. The fact that the calculated chi-square statistics are significant is an indication that the data matrix is suitable. Barlett's sphericity test examines whether there is a correlation between the variables on the basis of partial correlations. The fact that the calculated chi-square statistics are significant can be regarded as proof of the normality of the scores [26]. For the 40 items evaluated, the KMO value was determined to be. 97, and Bartlett's test result was determined to be 24504.358 ($p<.0001$). These values demonstrate that the trial form is suitable for factor analysis.

Table 1. Item-Total Test Correlation Values

Item No	Item Correlation	Item No	Item Correlation	Item No	Item Correlation	Item No	Item Correlation
M1	.368	**M13**	.662	**M25**	.437	**M37**	.703
***M2**	.233	**M14**	.608	**M26**	.677	**M38**	.521
M3	.723	***M15**	.275	**M27**	.747	**M39**	.553
M4	.671	**M16**	.731	**M28**	.598	**M40**	.689
M5	.710	**M17**	.529	**M29**	.649	**M41**	.387
M6	.587	**M18**	.716	**M30**	.616	**M42**	.700
M7	.622	**M19**	.703	**M31**	.697	***M43**	.225
M8	.522	**M20**	.494	***M32**	.009	***M44**	.220
M9	.463	**M21**	.607	**M33**	.431	**M45**	.716
M10	.668	**M22**	.552	**M34**	.407		
M11	.603	**M23**	.586	**M35**	.705		
M12	.669	**M24**	.521	**M36**	.569		

***Items of which the item-total correlation value was below 0.30 and which were excluded from the scale

3.2. Validity

The validity of the scale was tested by examining the scale's construct validity and internal validity. Factor analysis was performed to determine to construct validity, and a 27% lower-upper group comparison was made to determine internal validity.

Construct Validity: Exploratory factor analysis was performed to determine to construct validity. Exploratory factor analysis is a method that is useful in determining under how many headings the items (variables) will be gathered in a measurement tool prepared and implemented as a draft and that aims to find factors based on the relationship between the variables and that is commonly used to determine the construct validity of the scale [17.24.26]. While determining the number of factors to be included in a scale, in the factor analysis, the eigenvalue of each sub-dimension should be at least 1 and higher, and it should explain at least 5% of the variance. Furthermore, the opinion that the variance explained by the scale should be higher than the variance that cannot be explained is accepted as a fundamental principle [24]. In this study, these criteria were given importance at a maximum level. While determining the factors, attention was paid to the fact that the eigenvalue of each factor was greater than 1 and each factor could explain at least 5% of the variance, and the total variance was above 50%, and the selection of the items was made accordingly. Moreover, the line graph was observed to

lose its slope after the 3rd factor, and it was determined that the scale could consist of 3 factors, each of which could explain at least 5% of the variance and had an eigenvalue greater than 1.

After examination of the line graph, factor load values, and explained variances, item selection was made over the 3-factor structure of the scale through factor analysis. Factor analysis is a multivariate statistic aiming to find and explore a small number of new variables (factors, dimensions) that are unrelated and conceptually meaningful by bringing together the p number of variables related to each other [26]. Various criteria are suggested in the literature for item selection in factor analysis. The first one of these is related to the factor load value. Although the items' factor load value of 0.45 and above is a suitable criterion for selection, this value can decrease up to 0.30. In this study, item selection was performed more rigidly, and the items with a factor load value of 0.50 and higher were selected. The second criterion is that the items have a high load value in one factor and a low load value in other factors. It is recommended that the difference between the two high load values should be at least. 10 [24,26]. In this study, this criterion was taken into consideration, and the items, of which difference between two high load values was at least. 10, were considered as overlapping items and were not put into the process. As a result of the factor analysis, ten items with the factor load value below .50, and seven overlapping items were excluded from the study, and the study was continued with a 23-item trial form.

Table 2. Factor values and variance ratios of the Kolorta nursing attitude scale

Factors	Eigenvalue	Variance Percentage (%)	Cumulative Variance Percentage (%)
Factor 1	11.01	47.9	47.9
Factor 2	1.80	7.8	55.7
Factor 3	1.35	5.9	61.6

In the obtained 3-factor scale, the first factor explained 47,9% of the total variance, the second factor explained 7,8% of the total variance, and the third factor explained 5,9% of the total variance. It was determined that three factors together explained 61,6% of the total variance. These percentages indicate that the variance explained by the factors separately and together is sufficient.

As a result of the process of selecting items for the factors, a scale consisting of 3 dimensions and 23 items was obtained. The first factor consists of 12 items, and the factor load values of the items vary between. 507 and. 771. The second factor consists of 8 items, and the factor load values of the items vary between .564 and .763. The third factor consists of 3 items, and the factor load values of the items vary between .593 and .788. As a result of evaluations and expert opinions, it was found appropriate to name factor 1 as "professional preference" since it includes statements related to the preference of profession, the continuation of the profession, and personal adjustment. When factor 2 was examined, this factor was observed to be related to the adoption of the profession, and this dimension was named "professional adoption." When factor 3 was examined, this factor was observed to be related to the respectability of the profession and was named " professional respectability."

Table 3. Factor items and Item factor load values

Item No	Factor 1	Factor 2	Factor 3
M30	.771		
M29	.763		
M25	.750		
M10	.718		
M26	.712		
M18	.692		
M27	.644		
M12	.617		
M42	.607		
M19	.605		
M6	.539		
M16	.507		
M31		.763	
M35		.761	
M45		.745	
M39		.717	
M5		.708	
M40		.686	
M3		.620	
M37		.564	
M22			.788
M23			.776
M24			.593

Factor 1: Professional preference, Factor 2: Professional adoption, Factor 3: Professional respectability

Internal validity: Whether or not the items that were decided to be kept in the scale had internal validity was tested by the "t-test in independent groups." The test scores obtained from the scale were ranked from small to large, and 27% of the sample consisting of 1034 people was determined to be 279 people. Afterward, 279 people with the lowest score according to the scale score were re-coded as the lower group, and 279 people with the highest score were recoded as the upper group. The remaining people were not included in the process. After this process, whether the difference between the lower group and the upper group was significant was examined by the t-test in independent groups."

Table 4. Results related to the internal validity of the Kolorta nursing attitude scale

Group	n	Average	Standard Error	t	p
Lower Group	279	54.86	.666	62.029	.000
Upper Group	279	102.50	.380		

**p<0.001*

When the results related to the internal validity of the nursing attitude scale were examined, the difference between the scale's average scores of the lower group and the upper group was determined to be significant ($p<0.001$). According to this result, it can be said that the Kolorta nursing attitude scale

distinguishes individuals who have positive attitudes towards nursing from individuals who have negative attitudes, i.e. the scale has internal validity.

3.3. Reliability

In Likert-type scales, firstly, internal consistency should be checked. Internal consistency is related to the extent to which the items that make up the scale are compatible with each other. The most convenient way for this is to calculate Cronbach's α reliability coefficient. Besides, if necessary, reliability can be tested using the test-retest method [8,19]. In this study, Cronbach's α reliability coefficient and test-retest consistency were calculated in order to test the reliability of the scale.

Cronbach's Alpha: The reliability coefficients can be calculated with the help of different methods in the enhancement of measurement tools developed to measure cognitive and affective characteristics. One of these methods is Cronbach's Alpha (Cronbach's α) reliability. The coefficient of reliability that can be considered sufficient in a Likert-type scale should be above .70, but this value is desired to be as close to 1 as possible [8,13]. Cronbach's α value for research scales is recommended to be as follows: Unacceptable under .60, not desirable between .60 and .65, acceptable at a minimum level between .65 and .70, notable between .70 and .80, and very good between .80 and .90. When it is much higher than .90, the researcher is recommended to shorten the scale [13].

In this study, Cronbach's α value was calculated to be .90 for the overall scale. This value indicates that the reliability of the items in the scale is high and they aim to measure the same attitude. In other words, it can be said that this scale reliably distinguishes the attitudes of nurses and nursing students towards nursing.

Table 5. Results related to the reliability of the Kolorta nursing attitude scale

Factor	Factor name	Number of items	Cronbach α value
Factor I	Professional preference	12	.92
Factor II	Professional adoption	8	.91
Factor III	Professional respectability	3	.79
	Total	**23**	.90

Test-Retest Consistency: For the reliability of the scale, in addition to Cronbach's α reliability coefficient, the test-retest consistency of the scale was also calculated. This method was preferred since no significant change in the attitudes of the sample towards the nursing profession was expected. Test-retest reliability is a measure of the ability of a measurement tool to yield consistent results from implementation to implementation [8]. In this study, the validated 23-item form was implemented to 76 people from the study universe for test-retest reliability at a three-week interval. As a result of these implementations, no statistically significant difference was observed between the two measurements ($p>0.05$). According to this result, it was determined that the obtained scale is reliable and that it measures attitudes towards clinical practice reliably.

3.4. Scale instruction:

The "Kolorta nursing attitude scale" was developed in order to determine the attitudes of nurses and nursing students towards nursing. The obtained 23-item scale was renumbered from 1 to 23 from small to large, and the final shape was given to the form. The scale consists of 3 sub-dimensions and 23

items and can explain 61.6% of the total variance for nursing attitudes. The first factor consists of 12 items (Item 2, 3, 4, 7, 8, 10, 11, 14, 17, 18, 20, and 23) and its Cronbach's α reliability coefficient is .92. The second factor consists of 8 items (Item 1, 5, 6, 9, 12, 15, 19, and 22) and its Cronbach's α reliability coefficient is .91. The third factor consists of 3 items (Item 13, 16, and 21) and its Cronbach's α reliability coefficient was determined to be .79. The overall Cronbach's α reliability coefficient of the scale was calculated to be .90, and this value indicates high reliability. In the scoring of the scale, items 2, 3, 4, 7, 8, 10, 11, 14, 17, 18, 20, and 23 are scored inversely. The total score that can be taken from the overall scale varies between 23 and 115. The average response time to the form was determined to be 72 seconds.

4. Conclusion and Recommendations

As a result of this study, the validity and reliability of the Kolorta nursing attitude scale were tested to measure the attitudes of nurses and nursing students towards nursing. The developed attitude scale is a valid scale in terms of scope and content and has high reliability. Researchers conducting studies in the clinical field frequently experience failures in data collection processes due to the intensive work tempo of nurses and the length of questionnaires. Therefore, in this study, the number of questions was kept at a minimum level, and the statements were designed as short and clear as possible, in order for both the researchers to be able to use the form easily and nurses and nursing students to be able to answer the form in a practical way. Thus, it was attempted to provide saving from resources. With this developed scale, the professional attitudes of nurses and nursing students can be determined, and initiatives can be taken to improve these attitudes. Thus, it can be ensured that positive professional attitudes are reflected in the health care system in a positive way, by increasing professional quality and job satisfaction.

Ethical Statement: Ethics committee approval was obtained from the Scientific Research and Publication Ethics Board of Artvin Çoruh University (Dated 18.05.2017, numbered 2017/3).

The compliance to Research and Publication Ethics: This work was carried out by obeying research and ethics rules.

Conflict of Interest

No conflict of interest has been declared by the authors.

Note: This research was presented as a full-text oral presentation on 06.11.2018 at the International Congress on Multidisciplinary Studies.

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