

# Validity and Reliability Study of the Occupational Anxiety Scale for Health Services Students

## Sağlık Hizmetleri Öğrencilerine Yönelik Mesleki Kaygı Ölçeği Geçerlik Güvenirlik Çalışması

İsmet ÇELEBİ<sup>a</sup>, Naime ŞEMERET<sup>b</sup>, Gülbahar ALKAŞ<sup>c</sup>, Ayfer KELEŞ<sup>c</sup>, Emre ŞEN<sup>d</sup>

<sup>a</sup>Department of Paramedic, Gazi University Vocational School of Health, Ankara, Türkiye

<sup>b</sup>Department of Paramedic, Sakarya University Vocational School of Health, Sakarya, Türkiye

<sup>c</sup>Department of Emergency Medicine, Gazi University Faculty of Medicine, Ankara, Türkiye

<sup>d</sup>Private, Ankara, Türkiye

**ABSTRACT Objective:** This study aims to conduct a validity and reliability study of the Occupational Anxiety Scale for health care students. **Material and Methods:** 973 people participated in this descriptive study. During the descriptive research phase, data was gathered using a questionnaire form and a Google form. The 5-stage scale development method presented by Cohen and Swerdlik was used to develop the occupational anxiety scale for health worker candidates who have undergraduate and associate degree education. First of all, the conceptual structure of the scale, the scale type, and the scaling technique were decided. The implementation phase of the scale, factor analysis in the item analysis part, and internal consistency and validity studies were carried out. **Results:** A structure consisting of a total of 32 questions with 5 factors was formed for undergraduate students; a structure consisting of a total of 30 questions with 4 factors was formed for associate degree students. It is seen that the standard factor loading values for the items in the professional knowledge factor vary between  $\lambda=0.41$  and  $\lambda=0.80$ , and the error variances vary between  $\epsilon=0.36$  and  $\epsilon=0.83$ . It is seen that the standard factor loading values for the items in the working life factor vary between  $\lambda=0.49$  and  $\lambda=0.72$ , and the error variances vary between  $\epsilon=0.48$  and  $\epsilon=0.76$ . Cronbach's alpha coefficient was 0.84 for the undergraduate scale and 0.81 for associate degree students. **Conclusion:** A valid and reliable measurement tool was created to measure occupational anxiety in health care students.

**Keywords:** Occupational anxiety; health students; health services

**ÖZET Amaç:** Bu çalışmanın amacı, Mesleki Kaygı Ölçeği'nin sağlık hizmetleri öğrencileri için geçerlik ve güvenilirlik çalışmasını yapmaktır. **Gereç ve Yöntemler:** Tanımlayıcı nitelikteki bu çalışmaya 973 kişi katılmıştır. Veri toplama formu Google form's üzerinden toplanmıştır. Lisans ve ön lisans eğitimi almış sağlık çalışanı adayları için Mesleki Kaygı Ölçeği'nin geliştirilmesinde Cohen ve Swerdlik tarafından sunulan 5 aşamalı ölçek geliştirme yöntemi kullanılmıştır. Öncelikle ölçeğin kavramsal yapısı, ölçek türü ve ölçekleme tekniğine karar verilmiştir. Ölçeğin uygulama aşaması, madde analizi bölümünde faktör analizi, iç tutarlılık ve geçerlik çalışmaları yapılmıştır. **Bulgular:** Lisans öğrencileri için 5 faktörlü toplam 32 sorudan oluşan bir yapı oluşturulmuştur; ön lisans öğrencileri için 4 faktörlü toplam 30 sorudan oluşan bir yapı oluşturulmuştur. Mesleki bilgi faktöründe yer alan maddeler için standart faktör yük değerlerinin  $\lambda=0,41$  ile  $\lambda=0,80$  arasında, hata varyanslarının ise  $\epsilon=0,36$  ile  $\epsilon=0,83$  arasında değiştiği görülmektedir. İş hayatı faktöründe yer alan maddeler için standart faktör yük değerlerinin  $\lambda=0,49$  ile  $\lambda=0,72$  arasında, hata varyanslarının ise  $\epsilon=0,48$  ile  $\epsilon=0,76$  arasında değiştiği görülmektedir. Ölçek ve alt boyutlardan alınan puanlar arttıkça katılımcıların mesleki kaygılarının da arttığı söylenebilir. Cronbach's alfa katsayısı lisans ölçeği için 0,84 ve ön lisans öğrencileri için 0,81'dir. **Sonuç:** Sağlık hizmetleri öğrencilerinde, mesleki kaygıyı ölçmek için geçerli ve güvenilir bir ölçme aracı oluşturulmuştur.

**Anahtar Kelimeler:** Mesleki kaygı; sağlık öğrencileri; sağlık hizmetleri

Anxiety can be defined as the state of being worried and uneasy about a personal situation, whether it will happen or not be possible at the moment or in the future. In other words, anxiety is a mental and physical reaction and the uneasiness experienced by the person, even though there is no substantial dan-

ger.<sup>1</sup> Although anxiety and fear are always thought to have the same meaning, on the contrary, the cause of fear is obvious and short-lived; anxiety, on the other hand, moves people with assumptions, although the source is not clear.<sup>2</sup> Anxiety is based on discomfort, tension, anxiety, and fear.<sup>3</sup>

**Correspondence:** İsmet ÇELEBİ

Department of Paramedic, Gazi University Vocational School of Health, Ankara, Türkiye

**E-mail:** ismetcelebi@gazi.edu.tr

Peer review under responsibility of Türkiye Klinikleri Journal of Health Sciences.

**Received:** 19 Aug 2022

**Accepted:** 02 Nov 2022

**Available online:** 18 Nov 2022

2536-4391 / Copyright © 2022 by Türkiye Klinikleri. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).



Professional anxieties about the future in the educational lives of people pave the way for the formation of occupational stress, the emergence of depression, the emergence of anxiety, and the occurrence of cardiovascular system diseases.<sup>4-6</sup> Anxiety can negatively affect vital decisions and initiatives by limiting the cognitive levels of students during education, as well as causing a feeling of tension and fear, which can threaten the individual's perception of the situation and cause him to make wrong decisions.<sup>7,8</sup> Since each profession differs in terms of education, working conditions, and difficulty, students' concerns may also vary according to the profession. If these concerns are generalized, it is seen that there are concerns such as inability to find a job after graduation, the financial dimension of the job, and inability to work.<sup>9</sup> In many studies, it has been concluded that there is a high level of professional anxiety in students who are candidates to become health professionals, and this affects the lives of students in many areas, especially academic achievement.<sup>3,4,8,10</sup> However, as far as we can see in the literature, there is no scale developed to measure the level of professional anxiety of students studying in the field of health.

This study aims to develop an occupational anxiety scale for healthcare worker candidates studying at undergraduate and associate levels.

## MATERIAL AND METHODS

This study was conducted in accordance with "the principles of the Declaration of Helsinki." This study, which is planned to improve the occupational anxiety scale for health worker candidates studying for an undergraduate and an associate degree, is in a descriptive model. During the descriptive research phase, data was gathered using a questionnaire form and a Google form. The questionnaire used at this stage consists of 2 parts; in the first part, there are questions about socio-demographic characteristics. In the 2nd part, there are questions about occupational anxiety for health worker candidates with undergraduate and associate degree education. In order to conduct this study, Gazi University's Non-Clinical Studies Ethics Commission dated January 21, 2021, E. permission has been obtained with the number 11213.

## STUDY GROUP

The first study group, in which occupational anxiety scales were developed and trial applications were made for undergraduate and associate degree health workers in health services, vocational schools, and health sciences, and the 2nd study group, in which confirmatory factor analysis (CFA) was applied to the faculties of 3 different universities. During the determination of the sample of the descriptive research, the rule of at least 5 times the number of items on the scale was considered.<sup>11</sup>

Participants reviewed the informed consent form before answering the questionnaire. After giving their consent to the informed consent form, they started to answer the questionnaire.

The criteria for inclusion of participants; he was over the age of 18 and was continuing his education in any of the vocational school of health, faculty of health sciences, school of health. Exclusion criteria for participants; be diagnosed with anxiety.

When Table 1 is examined, the most participation in study Group 1, which has an associate degree, is in the paramedic program with 29.4%, the female gender with 77.6%, and the first grade with 54.4%. The highest participation in the undergraduate study Group 1 is in the health management program with 23.7%, the female gender with 82.3%, and the 2nd grade with 29.7%.

## DEVELOPMENT OF THE MEASUREMENT TOOL

In developing the occupational anxiety scale the 5-stage scale development method presented by Cohen and Swerdlik was used for health worker candidates with undergraduate and associate degree education.<sup>11</sup> According to this 5-stage process, the conceptual structure of the scale should be stated as what the scale measures, whether the scale is necessary, and what the scale's purpose is, and the scale should be structured in the 2nd stage. Constructing the scale decides the type of scale (classification, order, range, and ratio) and scaling technique. Items were written according to this study's scale type and scaling technique. In the 3rd stage, the scale was applied to as many people as possible during the implementation stage of the scale. In the 4th stage, item analysis, fac-

**TABLE 1: Sociodemographic characteristics of the study Group 1.**

Associate model (n=562)			Licence (n=417)		
Study program	n	%	Study program	n	%
Paramedic	165	29.4	Healthcare management	99	23.7
Elderly care	84	14.9	Nursing	66	15.8
Medical laboratory technician	57	10.1	Physical therapy and rehabilitation	56	13.4
Dialysis technician	55	9.8	Social services	55	13.2
Medical documentation and secretarial	54	9.6	Midwifery	55	13.2
Pathology technician	54	9.6	Emergency and disaster management	44	10.6
Pharmacy services	51	9.1	Nutrition and dietetics	42	10.1
Child development	42	7.5			
Gender			Gender		
Man	126	22.4	Man	74	17.7
Woman	436	77.6	Woman	343	82.3
Class			Class		
First class	306	54.4	First class	116	27.8
Second class	256	45.6	Second class	124	29.7
			Third grade	90	21.6
			Fourth grade	87	20.9

tor analysis, internal consistency, and validity studies were carried out. This was the 5th and last stage. The validity and reliability study of the scale was looked at, and the implementation directive was written.

The relevant literature was scanned in detail to create the item pool of the occupational anxiety scale for health worker candidates who had received undergraduate and associate degree education. It has been observed that no scale has been developed before to measure the occupational anxiety of health worker candidates who have undergraduate and associate degree education. Muschalla and Linden, McCarthy et al., Özdiñç et al., Temel et al., Postacı et al. examined studies on the occupational anxiety levels of health worker candidates who had received undergraduate and associate degree education.<sup>2,7,12-14</sup> The interview and survey questions in the data collection tools used in these studies were compiled. Forty five statements from the compiled interview and survey questions were selected and converted into scale items. Care was taken to measure only one feature of the items, and it was tried to write items that could be understood in the same way by everyone. While writing the items, care was taken to measure only one feature of the item and make it understandable by the participants. In addition, reverse-scored items were

added to prevent random marking. After the item pool was created, it was decided that the measurement method of the scale would be Likert type. "The score obtained from a scale suitable for the Likert type or the technique of rating totals consists, in general, of the sum of the weights given to the responses to the items covered, or in technical words, the sum of the scores."<sup>15</sup> According to the Likert type, the items of the occupational anxiety scale for health worker candidates who received undergraduate and associate degree education were evaluated as "I am not worried (1)" "I am undecided (2)," and "I am worried (3)."

Expert opinion was sought to define the validity of the scale. Content validity is an indicator of whether the items that make up the test are sufficient in terms of quality and quantity to measure the desired feature.<sup>16</sup> First of all, the created item pool was corrected by following the spelling and language rules in line with an academician's opinions working in the Turkish education field. Then, all the items were collected in the item evaluation form and evaluated by five academicians from Gazi University, Sakarya University, İzmir Tınaztepe University and Sanko University, experts in the fields of public health, psychology, and nursing.

The item evaluation form has been prepared as -Unnecessary (1)-, -To be corrected (2)-, and -“Necessary (3)- and is arranged following the scoring of each item on the triple rating scale. In addition, the bottom part of each item was left blank so that the experts could express their additional views on the subject, and they were asked to fill it in when necessary. In line with the professional opinions, the items were changed, and it was concluded that the scale provided the level of representation of the scope.

CFA and exploratory factor analysis (EFA) were used to determine the construct validity of the scale developed within the scope of the research. EFA is the identification of the underlying dimensions of an area evaluated with a specific measurement tool.<sup>16</sup> In this context, EFA was used to determine the scale factors that were desired to be developed. An EFA was performed on the data obtained from study Group 1. CFA is used to study the level of verification of implicit characteristics (factors) on a specific theoretical basis.<sup>11</sup> In this direction, it was examined whether the factor structure obtained by applying the scale developed within the scope of the research was confirmed by applying CFA to the data obtained from the study group. Moreover, item-total correlations and subgroup-upper group t-tests were done on the study group data to look at how well the items were able to distinguish between groups.

## DATA ANALYSIS

During the scale development, LISREL 8.8 and SPSS 21.0 package statistics programs were used. Before starting the data analysis, it was checked whether the scales processed in the SPSS 21.0 program were missing and if incorrect data was entered. Items with incorrect data entry have been identified and corrected.

In order to define the factor structure of the scale and to examine its construct validity, EFA was performed on the study group data. Before proceeding to the EFA, the Kaiser-Meyer Olkin (KMO) multiple was calculated, and the Bartlett-Sphericity test was applied to ensure that the data of study Group 1 was suitable for factor analysis. Principal component analysis and the Promax rotation technique were used as factor extraction methods in EFA. In order to pro-

vide evidence for the reliability of the scale, Cronbach's alpha exponent were calculated. CFA was conducted to provide evidence for the validity of the factor structures of the scale obtained as a result of EFA. In confirmatory factor analysis, the compatibility of the established model with the data is evaluated. Accordingly, many fit and error indices are used to test the model-data fit. In this study, Root Mean Square Error of Approximation-root mean square error (RMSEA), chi-square value/degree of freedom ( $\chi^2/sd$ ), non-normed fit index (NNFI), goodness of fit index (GFI), comparative fit index (CFI), and adjusted goodness of fit index were used.

## RESULTS

This section gives analysis and results regarding the development of the occupational anxiety scale for health worker candidates studying at undergraduate and associate degree levels. As a result of the analysis, it was seen that the developed scale had a 5-factor structure for undergraduate students and a 4-factor structure for associate degree students. The values obtained related to this are given in Table 2.

According to the answers of undergraduate healthcare students, KMO value was found to be 0.94 in the first EFA results made with principal components analysis and the Bartlett Sphericity test was significant ( $\chi^2=10117.151$ ;  $p<0.001$ ). The explained variance rate was found to be 58.94%. However, when the factor load values of the items were examined, 12 of the 45 items (M22, M9, M23, M37, M30, M35, M1, M5, M8, M44, M34, M45) were determined within the scope of the study were excluded from the analysis because the factor load value was less than 0.30. A factor structure consisting of 32 items with 5 factors was obtained in the analysis made after the discarded items. As a result of the EFA, the KMO value was found to be 0.94, and the Bartlett Sphericity test was significant ( $\chi^2=7116.734$ ;  $p<0.001$ ). The total variance rate explained was 57.713% (Table 2). However, the load factor values of the examined items were determined to be 44th item and 14th item (M10, M11, M25, M16, M31, M39, M26, M37, M5, M1, M8, M22, M23, M40) within the scope of the research. Since the load factor value was less than 0.30, they were excluded from

**TABLE 2:** The characteristics of the Occupational Anxiety Scale for health services.

Factor (Undergraduate)	Eigenvalue	Variance (%)	Total variance (%)
Factor 1	11.906	36.079	36.079
Factor 2	2.583	7.827	43.906
Factor 3	1.802	5.460	49.365
Factor 4	1.544	4.678	54.043
Factor 5	1.211	3.670	57.713
Factor (associate degree)	Eigenvalue	Variance (%)	Total variance (%)
Factor 1	10.843	34.979	34.979
Factor 2	2.420	7.807	42.785
Factor 3	1.808	5.833	48.618
Factor 4	1.412	4.556	53.174

the analysis, respectively. The analysis was re-performed by removing these substances, and a factor structure consisting of 30 4-factor substances was obtained.

KMO value was found to be 0.95 in the first EFA results made with principal component analysis, according to the answers of the health services students with associate degree education, and the Bartlett Sphericity test was found to be significant ( $\chi^2=12968.435$ ;  $p<0.001$ ). The explained variance rate was found to be 60.083%. After excluding 14 items with a factor loading value below 0.30, the EFA value was found to be 0.94, and the Bartlett Sphericity test was significant ( $\chi^2=8135.963$ ;  $p<0.001$ ). The rate of total variance explained was 53.174% (Table 2).

When Table 3 is investigated, it is seen that the factor burden values of the items in both undergraduate and associate degree responses are higher than 0.30.

When Table 4 is investigated, it is seen that the  $\chi^2/sd$  value is 2.05, the RMSEA value is 0.05, and the NFI value is 0.97.

Figure 1 shows the figurative representation of the 5-factor measurement model and the items' standard factor loading values and error variance values.

When Figure 1 is examined, it is seen that the standard factor loading values for the items in the professional knowledge factor vary between  $\lambda=0.69$  and  $\lambda=0.89$ , and the error variances vary between

$\epsilon=0.21$  and  $\epsilon=0.52$ . It is seen that the standard factor loading values for the items included in the working life factor vary between  $\lambda=0.77$  and  $\lambda=0.94$ , and the error variances vary between  $\epsilon=0.12$  and  $\epsilon=0.41$ . It is seen that the standard factor loading values for the items in the occupational health factor vary between  $\lambda=0.53$  and  $\lambda=0.93$ , and the error variances vary between  $\epsilon=0.13$  and  $\epsilon=0.72$ .

When Table 5 is examined, it is seen that the  $\chi^2/sd$  value is 5.99, the RMSEA value is 0.09, and the NFI value is 0.95.

Figure 2 shows the figurative representation of the 4-factor measurement model and the standard factor loading values and error variance values for the items in the scale.

When Figure 2 is examined, it is seen that the standard factor loading values for the items in the professional knowledge factor vary between  $\lambda=0.41$  and  $\lambda=0.80$ , and the error variances vary between  $\epsilon=0.36$  and  $\epsilon=0.83$ . It is seen that the standard factor loading values for the items in the working life factor vary between  $\lambda=0.49$  and  $\lambda=0.72$ , and the error variances vary between  $\epsilon=0.48$  and  $\epsilon=0.76$ . It is observed that the standard factor load values for the items in the occupational health factor vary between  $\lambda=0.59$  and  $\lambda=0.86$ , and the error variances vary between  $\epsilon=0.25$  and  $\epsilon=0.65$ . It is seen that the standard factor loading values for the items in the communication skill factor vary between  $\lambda=0.58$  and  $\lambda=0.86$ , and the error variances vary between  $\epsilon=0.26$  and  $\epsilon=0.66$ .

**TABLE 3:** The results of the factor analysis of the Occupational Anxiety Scale for health services (results of the rotated basic components analysis).

Licence	Factor load values					Associate degree			
	Factor load values					Factor load values			
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 1	Factor 2	Factor 3	Factor 4
Matter 38	0.782					Matter 38	0.806		
Matter 4	0.708					Matter 44	0.791		
Matter 11	0.697					Matter 18	0.773		
Matter 18	0.692					Matter 41	0.750		
Matter 13	0.690					Matter 13	0.713		
Matter 20	0.673					Matter 42	0.691		
Matter 41	0.630					Matter 20	0.659		
Matter 19	0.585					Matter 15	0.641		
Matter 15	0.584					Matter 19	0.638		
Matter 42	0.558					Matter 4	0.612		
Matter 10	0.558					Matter 28	0.531		
Matter 28	0.385					Matter 43	0.387		
Matter 21		0.880				Matter 9	0.346		
Matter 36		0.765				Matter 36		0.826	
Matter 6		0.720				Matter 21		0.811	
Matter 29		0.664				Matter 6		0.743	
Matter 2			0.868			Matter 29		0.699	
Matter 3			0.858			Matter 35		0.485	
Matter 7			0.536			Matter 32		0.458	
Matter 16			0.490			Matter 34		0.387	
Matter 17			0.377			Matter 27		0.335	
Matter 32				-0.746		Matter 2			0.900
Matter 26				-0.730		Matter 3			0.864
Matter 40				-0.625		Matter 7			0.500
Matter 39				-0.568		Matter 17			0.385
Matter 43				-0.552		Matter 14			-0.813
Matter 27				-0.510		Matter 24			-0.735
Matter 31				-0.427		Matter 12			-0.690
Matter 14					0.886	Matter 45			-0.617
Matter 12					0.761	Matter 33			-0.573
Matter 24					0.667	Matter 30			-0.533
Matter 33					0.559				
Matter 25					0.369				

## DISCUSSION

This section discusses the findings regarding the development of the occupational anxiety scale for health worker candidates studying at undergraduate and associate degree levels. As can be seen in the findings section, first, surface validity was carried out to determine the validity of the occupational anxiety

scale for health worker candidates who have undergraduate and associate degree education. There is a lot of room for interpretation with surface validity, which is the least scientific of the 3 types of validity.<sup>8</sup>

During the research, a substance pool was made for the first stage, and peer review and expert opinions were used to change the scale and make it more accurate. Finally, a pilot application was made.

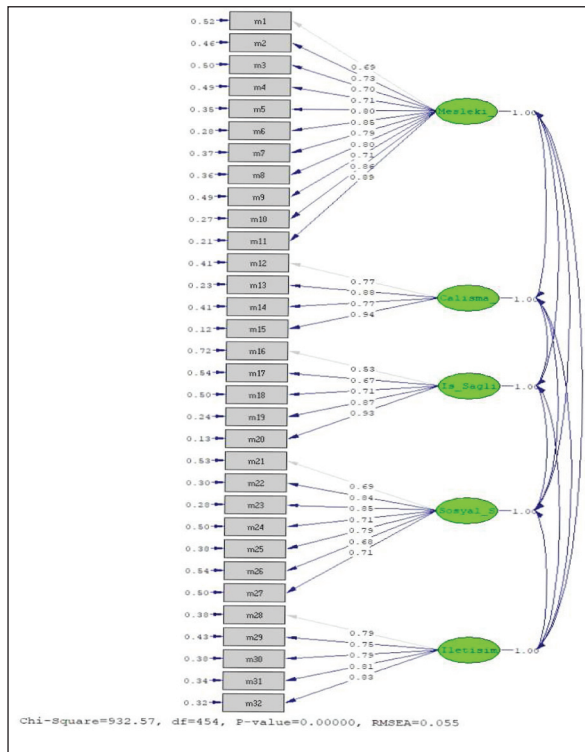


FIGURE 1: License scale measurement model (standard factor load values and standard error values).

EFA was first conducted for construct validity in developing the occupational anxiety scale for health worker candidates who have undergraduate and associate degree education, which was developed within the scope of the research. Principal component analysis was used as a factor extraction method in EFA. Before starting EFA, KMO coefficient and Bartlett Sphericity test results were examined to determine whether the data set is suitable for factor analysis. The KMO value varies between 0-1, and the KMO coefficient must be greater than 0.50 for the data set to be considered suitable for factor analysis. KMO value between 0.50-0.60 is “bad”, between 0.61-0.70 “weak”, between 0.71-0.80 “moderate”, between 0.81-0.90 “good” and over 0.90 indicates “excellent.”<sup>17</sup> This is what happened: In the scope of the study, the KMO value was found to be 0.94 for undergraduate students and 0.94 for associate degree students. The “perfect” level for factor extraction was found in the data set.

It is seen as sufficient that the variance ratio described in multi-factor patterns is 30%.<sup>11</sup> For this rea-

son, items with a factor load value of less than ‘0.30’ were excluded from the analysis, respectively. The variance ratio described by the multi-factor structure was 57.71% for undergraduates and 53.17% for associate degree students.

In order to provide evidence for the construct validity of the multi-factor model obtained as a result of EFA, CFA was performed on study Group 2 data. In order to test whether there is a multivariate outlier in the dataset, Mahalanobis distances were examined, and it was seen that there were no outliers. Finally, decoupling correlations were calculated for the problem of multiple decoupling between substances. The multiple decoupling problem is based on the linear relationship between variables. If the correlation between the items is between ‘0.70’ and ‘1.00’, it is said that there is a multicollinearity problem. The simple correlations between the scale items were examined, and it was determined that there was no value above

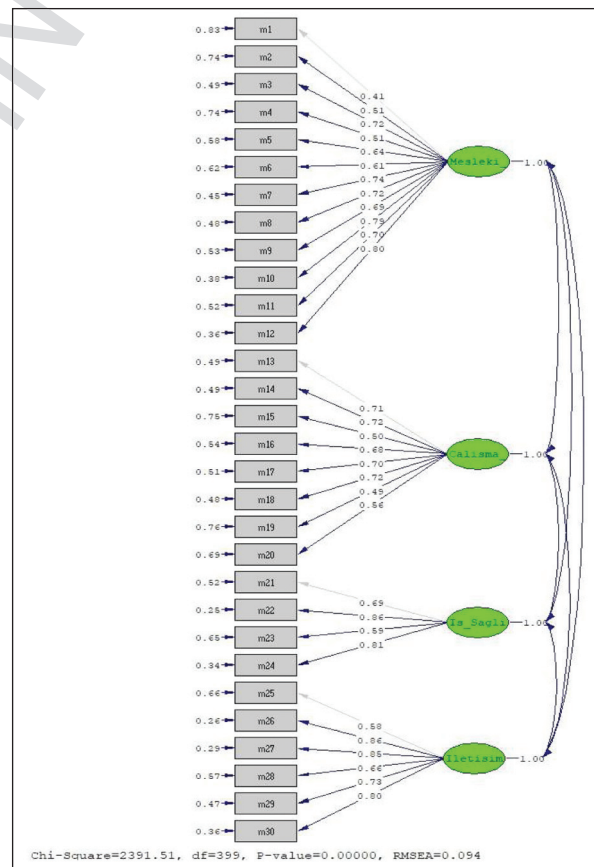


FIGURE 2: Associate degree scale measurement model (standard factor load values and standard error values).

**TABLE 4:** The confirmatory factor analysis of the scale of occupational anxiety for health services confirmatory factor analysis model data compliance index values.

Model	$\chi^2/sd$	RMSEA	NFI	NNFI	CFI	GFI	AGFI
Five-factor model	2.05	0.05	0.97	0.99	0.99	0.97	0.97

RMSEA: Root Mean Square Error of Approximation; NNFI: Non-normed fit index; CFI: Comparative fit index; GFI: Goodness of fit index; AGFI: Adjusted goodness of fit index.

**TABLE 5:** Confirmatory factor analysis of the Occupational Anxiety Scale for health services confirmatory factor analysis model data compliance index values.

Associate model	$\chi^2/sd$	RMSEA	NFI	NNFI	CFI	GFI	AGFI
Four-factor model	5.99	0.09	0.95	0.96	0.96	0.95	0.94

RMSEA: Root Mean Square Error of Approximation; NNFI: Non-normed fit index; CFI: Comparative fit index; GFI: Goodness of fit index; AGFI: Adjusted goodness of fit index.

0.70. Therefore, it was understood that there was no multicollinearity problem among the items on the scale.

When Table 4 and Table 5 are examined, it is seen that each fit index value meets the criterion values. First, the fact that the  $\chi^2/sd$  value is less than three indicates that the model fits the data well. The RMSEA value was also found to be less than 0.08. In addition, NFI, CFI, NNFI, AGFI and GFI values are very close to 1, indicating that the model fits the data very well. Taking the values of the model data fit indices as a criterion indicates that the model can meet the data fit.

As a result of CFA, after the index values of model-data fit meet the criterion values, the t values of the items should be examined. We want the t-value obtained for each item to be meaningful to ensure model-data fit and measure the properties that the items want to measure. Accordingly, if the t value for the items exceeds 1,96, they are considered significant at the 0.05 significance level and if it exceeds '2.56', they are considered significant at the 0.01 significance level. It was observed that t values for all items were significant at the 0.01 significance level in both the undergraduate and associate degree scales. After the t value for each item was found to be significant, standard factor loading values and error variances were examined. The fact that the standard factor load values for the items are higher than 0.30 and the error variances are lower than 0.90 indicates that the items can measure the property they want to measure.<sup>16</sup> Therefore, it can be interpreted that the

error variances of the items are low and the factor load values are high. With all these results obtained, we can say that the model for both scales is exceptionally well adapted to the data, and the substances contained in the model represent the relevant structures well.

The most important limitation of the study is that its reliability is lower than other research methods since the data is collected online.

## CONCLUSION AND RECOMMENDATIONS

This study, the Turkish reliability and validity study of the Occupational Anxiety Scale for Health Services Students was conducted. A scale consisting of 32 items with five factors was developed for health services students studying in undergraduate programs, and a scale consisting of 30 items with 4 factors for health services students studying in associate degree programs. While applying the scale, scoring should be done as, "I'm Not Anxious (1) I'm Undecided (2) I'm Anxious (3)" for the scale and its sub-dimensions, points are scored as at least 3 times the number of items and at the most. According to this developed scale, as the mean score of the total and sub-dimensions of the scale increases, the level of occupational anxiety increases.

Cronbach's alpha coefficient was 0.84 for the undergraduate scale; 0.81 for associate degree students. We recommend that researchers who want to use this scale should use the scale in different samples.



**APPENDIX 1: Vocational Anxiety Scale for undergraduate students.**

Situation	I'm Not Anxious (1)	I'm Undecided (2)	I'm Anxious (3)
<p><b>Factor 1: Professional Knowledge</b></p> <ol style="list-style-type: none"> <li>1. Not having enough condition in my job</li> <li>2. When the patient/patient relatives ask a question that I cannot answer, I am afraid of panic.</li> <li>3. Because of my colleagues finding my information insufficient</li> <li>4. Because I may do an action (medical malpractice) that may harm patients</li> <li>5. Failing to use the technology/equipment in the professional field correctly</li> <li>6. Since my professional knowledge and skills are found to be insufficient by the patient / patient's relative</li> <li>7. Avoid harming patients unintentionally in their professional life.</li> <li>8. Not being able to make the right decision in emergency situations</li> <li>9. From not being able to renew myself thinking that the knowledge and skills I have learned will be enough for me.</li> <li>10. Being back in my job because of my lack of knowledge</li> <li>11. I am not able to carry the features expected from me in line with the requirements of my profession in the unit I work.</li> </ol>			
<p><b>Factor 2: Work Life</b></p> <ol style="list-style-type: none"> <li>12. Being unemployed</li> <li>13. Receiving a low score from the assignment exam</li> <li>14. As a result of the appointment exam, I cannot be appointed to the place I want.</li> <li>15. As a result of the assignment exam, I cannot be appointed to any place.</li> </ol>			
<p><b>Factor 3: Occupational health</b></p> <ol style="list-style-type: none"> <li>16. I am afraid of getting a disease because of my job.</li> <li>17. I am afraid of having a work accident in my professional life.</li> <li>18. From experiencing restlessness before the shift/working hours.</li> <li>19. Being exposed to verbal and physical violence by the patient/relatives</li> <li>20. Being exposed to verbal and physical violence by my administrative superiors</li> </ol>			
<p><b>Factor 4: Social status</b></p> <ol style="list-style-type: none"> <li>21. Restriction of my social and cultural activities due to insufficient income</li> <li>22. Because the working environment is not suitable for my profession</li> <li>23. Not being respected by my co-workers</li> <li>24. I am not able to meet the needs of my family with the income I will get from my job.</li> <li>25. Due to the decrease in the respect for my profession in the society</li> <li>26. Because of the limited social and cultural activities where I do my job.</li> <li>27. Occupational organization (association, chamber, union, etc.) is insufficient</li> </ol>			
<p><b>Factor 5: Communication Skill</b></p> <ol style="list-style-type: none"> <li>28. Not being able to empathize with the patient/relatives</li> <li>29. Not being able to empathize with my colleagues</li> <li>30. Not being able to communicate with my colleagues</li> <li>31. Not being able to cope with problematic patients</li> <li>32. From not being able to communicate effectively with the individuals I care for.</li> </ol>			

**APPENDIX 2: Vocational Anxiety Scale for associate degree students.**

Situation	I'm Not Anxious (1)	I'm Undecided (2)	I'm Anxious (3)
<p>Factor 1: Professional knowledge</p> <ol style="list-style-type: none"> <li>1. Being back in my job because of my lack of knowledge</li> <li>2. From being inadequate to superior professional questions in working life</li> <li>3. I do not have the qualifications required by my profession, which is expected of me in the unit I work.</li> <li>4. Since my professional knowledge and skills are found to be insufficient by the patient/patient's relative</li> <li>5. Because I may do an action (medical malpractice) that may harm patients</li> <li>6. Not being able to use the technology/equipment in the professional field correctly</li> <li>7. Not being able to make the right decision in emergency situations</li> <li>8. Since the education I have received will not be enough in my professional life,</li> <li>9. Inadequate professional organization (association, chamber, union, etc.)</li> <li>10. From not being able to renew myself thinking that the knowledge and skills I have learned will be enough for me</li> <li>11. Avoid harming patients unintentionally in their professional life</li> <li>12. I can't find opportunities to improve myself about my profession.</li> </ol>			
<p>Factor 2: Work Life</p> <ol style="list-style-type: none"> <li>13. As a result of the appointment exam, I cannot be appointed to any place</li> <li>14. Receiving a low score in the assignment exam</li> <li>15. Being unemployed</li> <li>16. As a result of the appointment exam, I cannot be appointed to the place I want</li> <li>17. I am not able to meet the needs of my family with the income I will get from my job.</li> <li>18. Not being able to reach my target professional career</li> <li>19. Being assigned to another place out of my field</li> <li>20. Because the working environment is not suitable for my profession</li> </ol>			
<p>Factor 3: Occupational Health</p> <ol style="list-style-type: none"> <li>21. I am afraid of getting a disease because of my job</li> <li>22. I am afraid of having a work accident in my professional life</li> <li>23. From experiencing restlessness before the shift/working hours</li> <li>24. Being exposed to verbal and physical violence by my administrative superiors</li> </ol>			
<p>Factor 4: Communication</p> <ol style="list-style-type: none"> <li>25. Not being able to empathize with my colleagues</li> <li>26. Not being able to empathize with the patient/relatives</li> <li>27. Not being able to communicate with my colleagues</li> <li>28. From being unable to adapt to the socio-cultural structure of the place where I will work</li> <li>29. From not being able to communicate effectively with the individuals I care for</li> <li>30. Not being able to work in harmony with other occupational groups in the working environment</li> </ol>			

## Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

## Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, ex-

pertise, working conditions, share holding and similar situations in any firm.

## Authorship Contributions

**Idea/Concept:** İsmet Çelebi, Naime Şemeret; **Design:** İsmet Çelebi, Naime Şemeret, Gülbahar Alkaş; **Control/Supervision:** İsmet Çelebi, Emre Şen; **Data Collection and/or Processing:** İsmet Çelebi, Gülbahar Alkaş; **Analysis and/or Interpretation:** İsmet Çelebi, Naime Şemeret; **Literature Review:** İsmet Çelebi, Emre Şen; **Writing the Article:** İsmet Çelebi, Naime Şemeret, Gülbahar Alkaş; **Critical Review:** İsmet Çelebi, Gülbahar Alkaş; **References and Fundings:** İsmet Çelebi; **Materials:** İsmet Çelebi, Ayfer Keleş.

## REFERENCES

1. Şahin M. Korku, kaygı ve kaygı (anksiyete) bozuklukları [Fear, anxiety and anxiety disorders]. Journal of Eurasian Social and Economic Studies. 2019;6(10):117-35. <https://dergipark.org.tr/tr/pub/asead/issue/50855/663245>
2. Temel M, Celikkalp U, Bilgic S, Saracoglu GV. Hemşirelik öğrencilerinin mezuniyet sonrasında yönelik mesleki kaygıları ve etkileyen faktörler [Nursing students' post-graduation occupational anxiety and affecting factors]. Anatolian Journal of Nursing and Health Sciences. 2020;23(1):23-34. doi: 10.17049/ataunihem.478072
3. Gudykunst WB, Nishida T. Anxiety, uncertainty, and perceived effectiveness of communication across relationships and cultures. International Journal of Intercultural Relations. 2001;25(1):55-71. doi: 10.1016/S0147-1767(00)00042-0
4. Aronsson G, Theorell T, Grape T, Hammarström A, Hogstedt C, Martensdotter I, et al. A systematic review including meta-analysis of work environment and burnout symptoms. BMC Public Health. 2017;17(1):264. PMID: 28302088; PMCID: PMC5356239
5. Theorell T, Hammarström A, Aronsson G, Träskman Bendz L, Grape T, Hogstedt C, et al. A systematic review including meta-analysis of work environment and depressive symptoms. BMC Public Health. 2015;15:738. PMID: 26232123; PMCID: PMC4522058
6. Buist-Bouwman MA, de Graaf R, Vollebergh WA, Ormel J. Comorbidity of physical and mental disorders and the effect on work-loss days. Acta Psychiatr Scand. 2005;111(6):436-43. PMID: 15877710
7. Postacı ES, Uysal İ, Koşan AMA, Toraman Ç. Acil sağlık çalışanları için Mesleki Kaygı Ölçeği'nin geliştirilmesi [Developing an occupational anxiety scale for emergency medical service professionals]. Tıp Eğitimi Dünyası. 2020;19(58). doi: 10.25282/ted.689108
8. Ergin A, Uzun SU, Topaloğlu S. Pamukkale Üniversitesi Tıp Fakültesi 5. ve 6. sınıf öğrencilerinin sürekli kaygı ve mesleki kaygı düzeyleri ve bunları etkileyen etkenler [Trait anxiety and occupational anxiety levels of 5th and 6th grade students of Pamukkale University Faculty of Medicine and Factors Affecting These]. Muğla Sıtkı Koçman University Medical Journal. 2016;3(3):16-21. [https://www.researchgate.net/publication/318877034\\_Future\\_Occupational\\_Anxiety\\_and\\_Trait\\_Anxiety\\_Levels\\_of\\_5\\_th\\_And\\_6\\_th\\_Year\\_Medical\\_Students\\_at\\_Pamukkale\\_University\\_and\\_Their\\_Contributing\\_Factors](https://www.researchgate.net/publication/318877034_Future_Occupational_Anxiety_and_Trait_Anxiety_Levels_of_5_th_And_6_th_Year_Medical_Students_at_Pamukkale_University_and_Their_Contributing_Factors)
9. Baltacı F, Unguren E, Avsallı H, Demirel NH. Turizm eğitimi alan öğrencilerin eğitim memnuniyetlerinin ve geleceğe yönelik bakış açılarının belirlenmesine yönelik bir araştırma [A study on the determination of educational satisfaction and future perspectives of tourism education students]. International Journal of Alanya Business Faculty. 2012;4(1):17-25. <https://dergipark.org.tr/tr/pub/uaifd/issue/21593/231856>
10. Abu Ruz ME, Al-Akash HY, Jarrah S. Persistent (anxiety and depression) affected academic achievement and absenteeism in nursing students. Open Nurs J. 2018;12:171-9. PMID: 30258506; PMCID: PMC6128014
11. Cohen RJ, Swerdlik ME. Psychological Testing and Assessment: An Introduction to Tests and Measurement. 7th ed. Boston: McGraw Hill; 2009.
12. McCarthy JM, Trougakos JP, Cheng BH. Are anxious workers less productive workers? It depends on the quality of social exchange. J Appl Psychol. 2016;101(2):279-91. PMID: 26375962
13. Muschalla B, Linden M. Workplace phobia—a first explorative study on its relation to established anxiety disorders, sick leave, and work-directed treatment. Psychol Health Med. 2009;14(5):591-605. PMID: 19844838
14. Özdiç S, Biçici Y, Mud M, Turan FN. Determination of occupational anxiety levels of undergraduate students in physiotherapy and rehabilitation education. Journal of Higher Education & Science. 2018;12(3). doi: 10.5961/jhes.2018.288
15. Tezbaşaran A. Likert Tipi Ölçek Hazırlama Kılavuzu. 2008. Erişim linki: [https://www.academia.edu/1288035/Likert\\_Tipi\\_%C3%96%C3%A7ek\\_Haz%C4%B1rlama\\_K%C4%B1guide\\_page](https://www.academia.edu/1288035/Likert_Tipi_%C3%96%C3%A7ek_Haz%C4%B1rlama_K%C4%B1guide_page) Erişim tarihi eklenmelidir.
16. Büyüköztürk S, Kılıç Çakmak E, Akgün ÖE, Karadeniz S, Demirel F. Bilimsel Araştırma Yöntemleri. 12. Baskı. Ankara: Pegem Akademi; 2012.
17. Pett MA, Lackey NR, Sullivan JJ. Making Sense of Factor Analysis: The Use of Factor Analysis for Instrument Development in Health Care Research. 1st ed. California: Sage Publications, Inc; 2003.