ORIGINAL RESEARCH ORİJİNAL ARAŞTIRMA

DOI: 10.5336/healthsci.2024-104920

Occupational Anxiety Scale for Healthcare Professionals: Validity Study

Sağlık Çalışanları için Mesleki Kaygı Ölçeği: Geçerlilik Çalışması

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ABSTRACT Objective: This study was planned to develop a standard scale that categorizes all employees working in the field of health and measures their professional anxiety levels. **Material and Methods:** In the validity and reliability process of the occupational anxiety scale for healthcare professionals, the validity and reliability method of the scale put forward by Cohen and Swerdlik was used. During the first stage of the scale development, 374 healthcare employees participated in the study and 322 healthcare employees participated in the second stage. **Results:** The study variance rate of this study was found to be 54.74% and the factor load values of 31 items included in the analysis were higher than 0.30. It can be observed that the chi-square/standard deviation value is 2.76, the comparative fit index is 0.85, and the adjusted goodness of fit index is 0.93. As a consequence of the items distribution, "factor 1" was named "patient-centered (PAC)", "factor 2 "was named "person-centered (PEC)" and "factor 3" was named "work-centered (WOC)". The Cronbach's Alpha values are 0.936 for the PAC sub-dimension, 0.876 for the PEC sub-dimension, 0.864 for the WOC sub-dimension and 0.945 for the total scale items. **Conclusion:** Conclusion: In conclusion, a valid and reliable scale consisting of 31 items was developed. According to this developed scale, the tendency for professional anxiety in healthcare professionals increases as the total mean score and that of the sub-dimensions of the scale increases. It is recommended that this scale be applied in different communities.

Keywords: Healthcare employee; occupational anxiety; scale; reliability; validity

ÖZET Amaç: Bu çalışmanın amacı sağlık alanında çalışan tüm çalışanları kategorize ederek mesleki kaygı düzeylerini ölçen standart bir ölçek geliştirmektir. **Gereç ve Yöntemler:** Sağlık çalışanlarına yönelik mesleki kaygı ölçeğinin geliştirilmesi sürecinde Cohen ve Swerdlik tarafından sunulan ölçeğin geçerlik ve güvenirlik yöntemi kullanıldı. Ölçeğin geliştirilmesinin ilk aşamasında çalışmaya 374 sağlık çalışanı, ikinci aşamada ise 322 sağlık çalışanı katılmıştır. **Bulgular:** Bu çalışmanın varyans oranı %54,74 olarak bulunmuş ve analize dâhil edilen 31 maddenin faktör yük değerleri 0,30'dan yüksek çıkmıştır. Kikare/standart sapma değerinin 2,76, karşılaştırmalı uyum indeksinin 0,85, düzenlenmiş iyilik uyum indeksi ise 0,93 olduğu görülmektedir. Madde dağılımı sonucunda faktör 1'e "hasta merkezli [patient-centered (PAC)]", faktör 2'ye "kişi merkezli [person-centered (PEC)]" ve faktör 3'e "iş merkezli [work-centered (WOC)]" adı verilmiştir. Cronbach'ın alfa değerleri ise PAC alt boyutu için 0,936, PEC alt boyutu için 0,876, WOC alt boyutu için 0,864 ve toplam ölçek maddeleri için 0,945'tir. **Sonuç:** Sonuç olarak 31 maddeden oluşan geçerli ve güvenilir bir ölçek geliştirildi. Geliştirilen bu ölçeğe göre, ölçeğin alt boyutları ve toplam puan ortalaması arttıkça sağlık çalışanlarının mesleki kaygı eğilimi de artmaktadır. Bu ölçeğin farklı topluluklarda uygulanması önerilmektedir.

Anahtar Kelimeler: Sağlık çalışanı; mesleki kaygı; ölçek; güvenirlik; geçerlilik

Anxiety is the state of worry and restlessness concerning an ongoing subjective situation or how that situation might or might not take place in the future. Anxiety by another definition, is a psychological and physical reaction that a person shows along with the uneasiness he/she experiences, without any

TO CITE THIS ARTICLE:
Çelebi İ, Balcı E, Gökkaya E, Üstün Ö. Occupational anxiety scale for healthcare professionals: Validity study. Turkiye Klinikleri J Health Sci. 2025;10(1):124-30.

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

Received: 18 Jul 2024 ***Received in revised form:*** 20 Nov 2024 ***Accepted:*** 20 Nov 2024 ***Available online:*** 30 Jan 2025

concrete danger.[1] Although the source of anxiety is not clear, it makes people act on assumptions.[2] The basis of anxiety lies in discomfort, tension, worry and anxiety.[3]

Occupational anxiety (OA) is defined as a source of anxiety that threatens the objectives of a person and results in a series of physical, psychological and behavioral reactions.[4] It is believed that the current levels of OA in individuals negatively affect their occupational performance and satisfaction and the performance of the individual.[5] It has been observed that as the level of OA increases, individuals experience cognitive distortions such as decreasing confidence in coping with challenging situations questioning their skills and paying more attention to threatening stimuli.[6,7] OA disorders also reveal the situation in which individuals cannot make use of their professional skills properly. It is examined that when individuals perceive environmental demands as threatening and feel that they do not have the resources to respond to these demands, a situation of OA occurs and the work is not done properly.[8]

Healthcare workers are individuals who are in direct contact with patients and their relatives and work long hours. These people work under intense stress and are directly involved with crisis management and environmental factors for most of their time. This study was planned to develop a standard scale that categorizes all employees working in the field of health and measures their professional anxiety levels.

MATERIAL AND METHODS

The study was approved by the ethics committee of Kayseri University (Date: November 03, 2023, No: 77075). This study was conducted in accordance with the principles of the Declaration of Helsinki.

TYPE OF RESEARCH

The aim of this descriptive study is to assess the validity and reliability of a professional anxiety scale for healthcare professionals.

STUDY GROUP

The study involved two groups of healthcare professionals in Türkiye. Group 1 participated in the development and testing of the Occupational Anxiety Scales for Healthcare Workers (OASH), while Group 2 was used for confirmatory factor analysis (CFA). In determining the sample of the descriptive study, a number equal to at least five times the number of items in the scale was applied according to the rule.[9] The criteria for inclusion in the study were being over 18 years old and working in any health institution. Healthcare workers with a psychiatric diagnosis for any reason were excluded from the study. Data collection was carried out online via Google Forms (Google, ABD). The form was shared through social media groups belonging to healthcare workers in Ankara.

A total of 374 healthcare professionals participated in study Group 1. To summarize the sociodemographic characteristics of study Group 1, it can be concluded that the average age was 38.14±10.44 (minimum: 18.00, maximum: 61.00) years, 64.7% of the participants were married, 68.4% were female, 30.5% were nurses and 57.8% had a bachelor's degree. A total of 322 healthcare professionals participated in study Group 2. To summarize the sociodemographic characteristics of study Group 2, it can be concluded that the average age was 37.88±10.29 (minimum: 18, maximum: 59) years, 65.8% of the participants were married, 68.6% were female, 27.6% were nurses, and 62.1% had a bachelor's degree.

SCALE DEVELOPMENT STAGES

In the process of developing the OASH, the validity and reliability method presented by Cohen, and Swerdlik was used.[9] First, the conceptional structure of the scale was established. In other words, it was defined what the scale measured and what the purpose of the scale was. In the second stage, the scale was structured. Constructing the scale is defined as deciding on the scale type (classification, ranking, ratio and range) scaling technique. Items were written according to the determined scaling technique and scale type. The third stage was the primary application stage of the scale. After the scale was applied, the factor analysis, validity studies and internal consistency were executed in the item analysis section, which was the fourth stage. The fifth stage was the

second application phase of the scale, and at this stage, the scale was reviewed by test-retest and an application guide was prepared.[9]

FORMING AN ITEM POOL

In order to prepare the item pool of the OASH, the relevant literature was scanned in detail. As a result of the literature review; the interview forms included in the study conducted by Temel et al. investigating the Professional Anxiety of Nursing Students After Graduation and the Influencing Factors; the study conducted by Dixit and Ghosh, which examined the professional anxiety of healthcare workers qualitatively; the professional anxiety scale developed by Postacı et al. for emergency healthcare personnel; the study conducted by McCarthy et al. on how much anxiety in employees reduces productivity; the study conducted by Özdinç et al. examining the professional anxiety level of physiotherapy students and the influencing factors; and the study conducted by Monterrosa-Castro et al. examining the professional stress, anxiety, and fear of COVID-19 of Colombian medical doctors were taken into consideration.[2,10-14]

Since no scale has been done validity and reliability previously to measure the OA of healthcare professionals, 36 statements were selected from the survey questions, compiled interview and converted into scale items in forming the item pool. Caution was taken to ensure that the items measured only one characteristic, and attempts were made to form items that would be understood by everyone in the same manner. While writing down the items, caution was taken to measure only one feature in an item and to ensure that it was understandable even at the primary school education level. In addition, reverse-scored items were written to prevent participants from randomly marking the questions. After forming the item pool, it was deemed appropriate for the measurement method of this scale to be Likert type. "In general, Likert type measurements consist of either the sum of the weights of the responses to the items within the scope of the scale or, theoretically, the sum of the scores".[15] The items of the OASH were graded with "Disagree (1)", "Undecided (2)" and "Agree (3)", in accordance with the Likert scale.

CONTENT VALIDITY

Content validity is a pointer of whether the items in the item pool are of sufficient quantity and quality to indicate the feature we want.[16] Therefore, experts in the relevant field were consulted to ensure the content validity of the scale. All items were collected in a items evaluation form and directed to six experts (These experts were academicians in the fields of psychology, human resources, nursing, public health, and management).

The expert opinion form was prepared according to a triple rating (appropriate, correction required and not appropriate). The item pool was corrected based on expert opinions.

LANGUAGE VALIDITY

Before the pilot study of the draft items, a linguist evaluated and edited the items for their suitability to semantic and grammatical rules. In the pilot study, participants received feedback on the design, clarity and content of the survey.

To determine the understandability level of the draft items, 10 healthcare professionals were asked to read the all items, explain what they understood from all item. 10 healthcare professionals agreed that the items were understood.

CONSTRUCT VALIDITY

The Exploratory factor analysis (EFA) and CFA were used to examine the construct validity of the scale validity and reliability within the scope of the study. EFA enables the definition of different dimensions that the developed scale can measure.[16] In addition, CFA analysis was conducted to examine whether the factor structure obtained as a result of the trial application of the developed scale was confirmed or not.

DATA COLLECTION FORM

The data collection form, which consists of two parts, was created via Google Forms. In the first part, the sociodemographic features of the participants such as gender, age professional title, education level were included, and in the second part, the item pool created regarding OA was included.

ANALYSIS

The LISREL 8.81, and SPSS 23.0 (IBM, Armonk, NY, ABD) programs were used in the developmental stages of the scale. Since the skewness and kurtosis values of each item were within ±2.0, it was considered to be normally distributed.[17]

EFA was performed by study group 1 data to determine the factor structure of the scale and examine its construct validity. Before proceeding with EFA, it was tested whether study group 1 data were suitable for factor extraction. For the convenience of the sample for factor analysis , the Kaiser-Meyer Olkin (KMO) value of >0.5, a Barlet test of p<0.05, and Anti-Image Correlation Matrix value of >0.5 were taken into account.[18] In EFA, the PCA was used as the factor extraction method and Promax rotation was applied. Factor loading values of 0.30 and above were used in this study. To prevent the factor loadings of two items from being considered overlapping, a difference of at least 0.15 between them was taken into account.[18]

In order to provide argument for the reliability of the scale, the α coefficients were calculated separately on the study group data for the entire scale and the factors that made up the scale. Cronbach's Alpha values are 0.936 for the Patient Centered (PAC) subdimension, 0.876 for the Person Centered (PEC) subdimension, 0.864 for the Work Centered (WOC) sub-dimension and 0.945 for the total scale items.

CFA was performed to provide an argument for the validity of the factor structures of the scale obtained as a finding of EFA. CFA, the compatibility of the model determined with the data was evaluated. Thus, many fit and error indices were used to test model data fit. In order to evaluate model data fit as a result of CFA in this study, indices such as Root Mean Square Error of Approximation-root mean square error (RMSEA), comparative fit index (CFI), chi-square value/degree of freedom (χ^2/df), non-normed fit index (NNFI), and goodness of fit index (GFI) were used.

RESULTS

EFA results conducted with the Principal Component Analysis (PCA) based on the responses of healthcare professionals, it was found that the OASH value was 0.867 and the Bartlett Sphericity test was significant (χ2=8165.995; p<0.001).The explained variance rate was found to be 54.74%. The factor loading value of all items was greater than 0.30. However, M12, M11, M36, M34 and M10 were included in 2 different subscales, and there was a factor loading difference of less than 0.15 in these items in the 2 subscales. For this reason, these items were considered overlapping items and were removed from the analysis. EFA was repeated by removing these items and a factor structure consisting of 31 items with three factors was obtained (Table 1).

According to Table 2, it can be observed that the factor load values of 31 items included in the analysis are higher than 0.30. The scale developed according to these results was named "Occupational Anxiety Scale for Healthcare Professionals".

In addition, a positive relationship between "factor 1" and "factor 2" (r:0.390; p<0.001) and a positive significant relationship between "factor 1" and "factor 3" (r:0.358; p<0.001) was found according to the correlation results of the factors.

According to Table 3, it can be observed that the χ^2/df value is 2.76, the CFI is 0.85, and the the adjusted goodness of fit index (AGFI) is 0.93.

A pictorial declaration of the three factor measurement model is shown in Figure 1. Figure 1 presents the standard factor load and error variance values for the items.

When the results are evaluated in general, the values at which the 31-item 3-dimensional model of the male form of the OASH are confirmed. The CFA results are given in Figure 1.

As a result of the item distribution, factor 1 was named PAC, factor 2 was named PEC, and factor 3

TABLE 1: Factor characteristics.

Factor	Eigenvalue	Variance (%)	Total variance (%)
Factor 1	11.964	38.593	38.593
Factor 2	3.173	10.234	48.828
Factor 3	1.833	5.912	54.740

was named WOC. The Cronbach's Alpha values are 0.936 for the PAC sub-dimension, 0.876 for the PEC sub- dimension, 0.864 for the WOC sub-dimension and 0.945 for the total scale items.

TABLE 2: Factor analysis results and t values.

	Factor Load Values			
	Factor 1	Factor 2	Factor 3	t value*
Item 20	0.909			6.82
Item 19	0.907			5.91
Item 22	0.818			12.12
Item 21	0.795			12.05
Item 32	0.648			12.37
Item 31	0.533			12.23
Item 15		0.929		12.28
Item 14		0.914		6.10
Item 17		0.693		6.91
Item 13		0.555		12.46
Item 18		0.515		12.02
Item 24		0.394		12.35
Item 16		0.372		12.56
Item 27		0.339		12.61
Item 28		-0.734		12.66
Item 26		-0.661		12.55
Item 4		-0.658		12.56
Item 6			0.847	12.54
Item 9			0.792	11.54
Item 5			0.729	11.78
Item 25			0.705	12.13
Item 33			0.590	12.12
Item 30			0.584	11.89
Item 23			0.528	12.26
Item 7			0.464	12.17
Item 35			0.468	12.18
Item 8			0.460	11.52
Item 3			0.423	11.41
Item 2			0.408	11.26
Item 1			0.397	11.89
Item 29			-0.375	11.83

*t value providing the significance of factor loadings estimated by CFA.

TABLE 3: Model data fit index values for scale confirmatory factor analysis.

Model	χ^2/df	RMSEA	NFI	NNFI	CFI	GFI	AGFI
Three factor model	2.76	<0.05	0.83	0.83	0.85	0.94	0.93

χ^2/df: Chi-square/degree of freedom. RMSEA: Root mean square error of approximation-root; NFI: Normed fit index; NNFI: Non-normed fit index; CFI: Comparative fit index; GFI: Goodness of fit index; AGFI: The adjusted goodness of fit index.

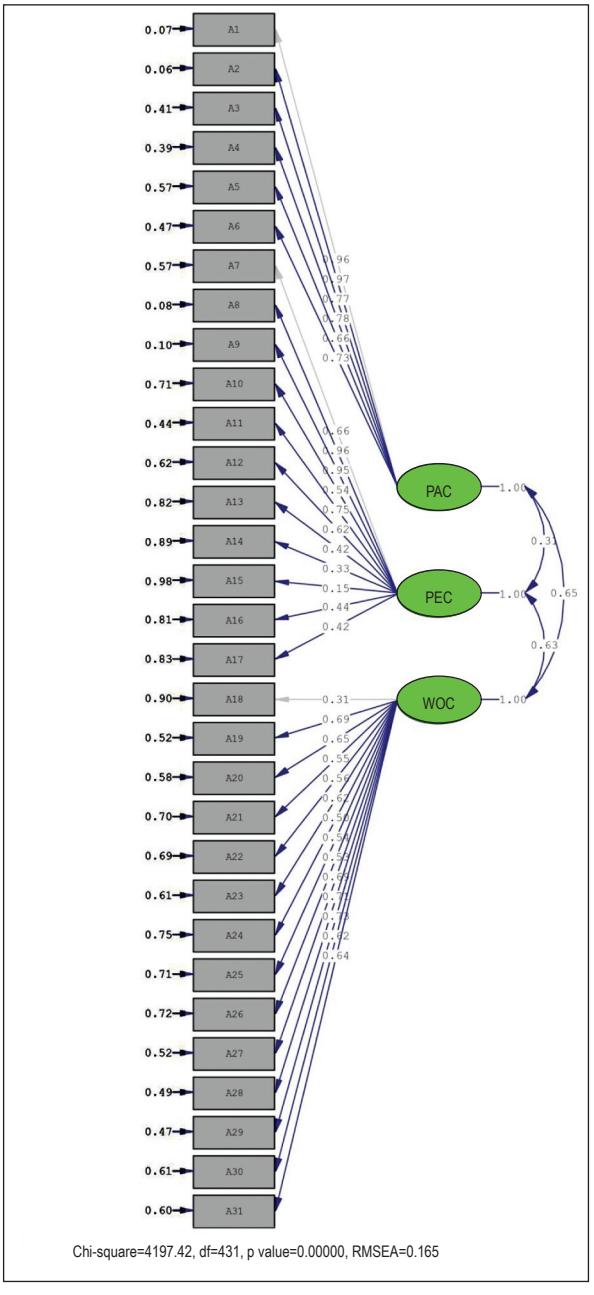

FIGURE 1: Occupational anxiety scale measurement model for healthcare professionals. PAC: Painted centered; PEC: Person centered; WOC: Work-centered.

DISCUSSION

Among all professional groups, healthcare professionals are considered a group highly affected by individual and organizational factors and, accordingly, face a high level of occupational anxiety.[19] High levels of OA have negative effects on attention and concentration and lead to the individual making mistakes

at work, deterioration in interpersonal relationships, deterioration in the person's health and decrease in work efficiency.[11]

For this purpose, face validity was first performed to determine the validity of the OASH. Face validity is highly subjective and the least scientific of the validity types.[20] Accordingly, an item pool was created at the first stage of the study for face validity, then peer evaluation was provided, afterwards the scale was re-evaluated according to expert's opinions. Then finally a pilot practice was carried out.

Primarily, EFA was conducted for the construct validity of the OASH validity and reliability within the scope of the study. PCA was used as the factor extraction method for EFA. Before than EFA, the OASH coefficient, and Bartlett Test of Sphericity results were examined to determine whether the data set was suitable for factor analysis. The OASH value varied between 0-1, and in order for the data set to be considered suitable for factor analysis, the OASH coefficient must be greater than 0.50. An OASH value between 0.50-0.60 was considered to be bad, for "0.61-0.70" to be poor, for "0.71-0.80" to be moderate, for "0.81-0.90" to be good, and a score above "0.90" to be very good.[20] Within the scope of the study, the OASH value was found to be 0.87 and it was concluded that the data set was at a "Good" level for factor extraction.

In multi-factor designs, 30% of the variance explained is considered sufficient.[18] For this reason, items with factor loading values less than 0.30 were removed from the analysis, respectively. A factor load value of at least 0.30 was accepted as the criterion value for substance elimination within the scope of this study. The variance ratio explained by the multi-factor structure was found to be 54.74%.

To provide evidence for the construct validity of the multifactor model obtained as a result of EFA, CFA was performed on "Study Group 2" data. To test whether there were multivariate outliers in the data set, Mahalonobis distances were examined, and it was observed that there were no outliers. Then, for the interitem multi-co linearity problem, inter-item correlations were investigated. A multi-co linearity problem is a problem based on the linear relationship among variables. If the correlation between the items is both 0.70 or 1.00, a multi-co linearity problem is present.[16] Simple correlations among the scale items were examined and it was determined that there were no values above 0.70. Thus, it was observed that there was no multicollinearity problem between the items in the scale.

The first thing to be evaluated in CFA is the chi-square (χ^2/df) fit statistic, which is included in the compatibility index absolute fit index group. If x^2/df is below 0.3, it means that the model has a good fit. If it is within 0.5, it is interpreted that the model has an acceptable fit. In our research, this value was found to be 2.76, indicating a good fit to the model. Additionally, the RMSEA is found to be less than 0.05. NNFI, NFI, GFI, and AGFI being close to 1 indicate that the model has a good fit to the data. If the model data fit index values meet the criterion values, it can be said that the established model meets the data fit. In our model, the CFI value was found to be 0.85. If the CFI value is between 0.80 and 0.90, it indicates a moderate level of fit, but it may indicate that the model can be improved.[21] However, no improvement has been made so far.

According to the CFA result, t values need to be examined in the next step. To ensure model data compatibility and to ensure that the items measure the desired characteristics, the t value obtained for each items must be significant. If the t value of each item exceeded 1.96, it was considered to be at the 0.05 significance level, and if the t value exceeded 2.56, it was considered to be at the 0.01 significance level. It was concluded that t values for all items were statistically significant at the 0.01 level. After the t value was found to be significant for each item, standard factor load error variances and values were examined. When all the items were examined, it was concluded that the items could measure the desired feature since the error variances were less than 0.90 and the factor load values were greater than 0.30.[22] According to all these results, it can be concluded that the models of both scales fit the data quite well and the items in the model represent the relevant structures well.

LIMITATIONS

There are some limitations in the design and development of OA scales for healthcare professionals.

Since the scale was developed in Turkish, further validity and reliability studies should be carried out by taking different cultures into consideration. In this study, the criterion-related validity of the scale was not examined, meaning data were not collected simultaneously on the scale and other similar scales. The failure to test criterion-related validity is a significant limitation.

CONCLUSION

This study explains the development and design process of the OA scale for healthcare professionals in the Turkish health workers. A detailed explanation of the steps in the development and design process of the OA scale for healthcare professionals for other communities that may use the tool was made, and the objectives, scopes and limitations were defined and explained. As a result, a valid and reliable scale consisting of 31 items (6 items for PAC sub-dimension; 11 items for PEC sub-dimension; 14 items for WOS sub-dimension) was developed.

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

Authorship Contributions

Idea/Concept: *İsmail Çelebi, Elçin Balcı, Emrah Gökkaya, Özge Üstün;* ***Design:*** *İsmail Çelebi, Özge Üstün, Elçin Balcı;* ***Control/Supervision:*** *İsmail Çelebi, Emrah Gökkaya;* ***Data Collection and/or Processing:*** *İsmail Çelebi, Elçin Balcı, Emrah Gökkaya;* ***Analysis and/or Interpretation:*** *İsmail Çelebi;* ***Literature Review:*** *İsmail Çelebi, Özge Üstün, Emrah Gökkaya;* ***Writing the Article:*** *İsmail Çelebi, Elçin Balcı, Özge Üstün;* ***Critical Review:*** *Elçin Balcı.*

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