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Nurse Stress Scale (NSS): Reliability and validity of the Turkish version

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Abstract

Purpose: This study aims to conduct the reliability and validity study of the Turkish version of the Nurse Stress Scale (NSS), which determines the job stress of nurses.

Design and Methods: The sample of the methodological study consisted of 349 nurses.

Results: The factor load of the scale was in the appropriate range (0.32-0.79), Cronbach's α was determined as .928, and the item total score correlations ranged between 0.418 and 0.662. The test-retest reliability coefficient was determined to be $r = .859$.

Practice Implications: The Turkish version of the NSS was evaluated and it was found that it could be used as a valid and reliable measurement tool in Turkish nurses. Health care service providers can use NSS to determine the work stress of nurses.

KEYWORDS

job stress, nurses, reliability, scale, validity

1 | INTRODUCTION

Stress is a universal experience that occurs when the physical and spiritual boundaries of the organism are strained and threatened and affects the lives of individuals.[1] According to the citation of Gray-Toft and Anderson,[2] stress is defined as an "internal sign that threatens the balance of the individual in a physical, social, or psychological environment." If the stress lasts long, the balance of the body deteriorates and physical, mental and social problems arise.[1]

The health care field is considered an environment in which more stress is experienced than other work environments because not only the individuals who are cared for but also the health care providers experience the stress factor very often.[3] In this field, those who spend the most time with patients are nurses who experience intense stress due to factors such as intense working hours, critical patient care, complex technological equipment, high expectations, and low motivation.[4] Herbert,[5] reported that nursing is the second most stressful profession in the United Kingdom. Work stress, its stress factors, physical health, psychological well-being of employees, and its significant effects on productivity in various occupations have been extensively investigated for more than 50 years. Research on the subject report that nurses are exposed to intense stress, and when they cannot cope with it, job satisfaction, patient care quality, and concentration decrease, and the rate of making mistakes increases.[6,7] The impaired balance between the desire to provide high-quality care and the effort to cope with the stressful environment also causes burnout in nurses. In addition, all of the stressors, including inadequate control, a lack of support, conflict with colleagues and patients, over workload.[8] Ng et al,[9] and working overtime Carlesi et al,[10] are all associated with one or more burnout factors. According to Cannon's theory of stress, the stress experienced by nurses results in headaches, insomnia, fatigue, social dysfunction, and depression.[11]

The stress in the nursing workforce is reported to cause many problems in terms of organizational issues such as organizational efficacy and efficiency, high labor turnover, absenteeism, decrease in the number and quality of the service provided, and great problems in the physical and mental health of nurses,[9,10] and it is stated to be an ongoing international cause of concern.[12,13] Moreover, it is indicated that many countries in the world experience significant nurse shortages in the health workforce.[14,15] For these reasons, it is very important to understand the stress factors and stress experiences of nurses in the workplace and protect and support them. Thus, nurses

can reach their full potential and help to meet the increasing needs in health care as well as improving service quality, so it is essential to evaluate stress and take measures against possible situations.

In the literature, the stress experienced by nurses has been evaluated with scales defined as general stress meter that are not only specific to nursing but used in various professions.[7,16-21] In the national field, a scale directly related to stress experienced by nurses has not been encountered in the literature, and the existing scales mostly cover education period of nursing students such as nursing education stress scale,[22] perceived stress scale.[23]

The current national and international studies specific to stress in nurses report that the stress experienced in the nursing profession with human contact is intense[20,24]; it decreases job satisfaction, it causes fatigue, burnout and depression and stress-related diseases[25,26]; and it is necessary to take measures quickly by determining the level of stress regardless of the unit the nurses work.[27-29] Since nursing is a unique profession and has different aspects from other disciplines, the stress experienced should be evaluated more comprehensively and in detail. For these reasons, it is thought that the nursing stress scale, in which only nursing-specific stress is evaluated and whose validity and reliability was performed by Gray-Toft and Anderson,[2] is of great importance. Accordingly, this study aimed to perform the reliability and validity study of the Turkish version of the Nurse Stress Scale (NSS), which measures the job stress of nurses.

2 | MATERIALS AND METHODS

2.1 | Research design and sample

This study was conducted in a methodological design to ensure the use of Turkish adaptation of the NSS as a reliable and valid measurement instruments in nursing research in Turkey. The study was performed with the volunteer nurses working in two city hospitals in Kocaeli and Kırklareli provinces in northwest Turkey between June and August 2019.

When adapting a scale to another culture, it has been suggested that the sample size for a reliable factor analysis should be at least 5 to 10 times nurses greater than the number of scale items.[30] Based on this suggestion, 349 nurses who had at least 6 months of working experience and agreed to participate in the study and answered the questionnaire completely were included in the study. The nurses who met the criteria for inclusion in the study were selected by using the nonrandom sampling method. We adapted NSS to Turkish culture in three phases. These phases were (a) language validity, (b) scale validity, and (c) scale reliability.

2.2 | Data collection

The data were collected using the face-to-face interview method from the nurses who agreed to participate in the study, with the 10-question "Personal Information Form" and 34-question "Nurse Stress Scale" developed by the researcher. The average time to complete the entire data collection form takes 5 to 7 minutes.

2.3 | Instruments

The Personal Information Form and the NSS were used for data collection.

2.3.1 | The personal information form

It consists of five sociodemographic questions including age, gender, marital status, education status, child presence of the nurses, and five questions regarding the characteristics of their working lives such as the institutions and the units they worked in, professional working experience, etc.

2.3.2 | The NSS

The original "Nurse Stress Scale," developed by Gray-Toft and Anderson[2] consists of 34 items and seven factors including "Uncertainty Concerning Treatment," "Workload," "The Death of a Patient," "Conflict with a Physician," "Conflict with Peers," "Insufficient Support," and "Suffering Patient." It is rated using the 4-point Likert system as (a) never, (b) sometimes, (c) often, (d) very often. The Cronbach α reliability coefficient of the original scale was found to be $\alpha = .89$ and $\alpha = .65$ to 0.80 for its subfactors. The total score measures the frequency of stress experienced by a nurse and can be calculated by adding the participant's responses to all items. The high overall score indicates that the nurse experiences more frequent stress periods about individual stress problems in the physical, psychological, and physical environment. A lower score indicates that the nurse experiences less stress for the same situations.[2]

Subfactors of the original scale

The physical environment

Factor VI: Workload. This factor includes stressful situations that arise from the nurse's workload, staffing and scheduling problems, and inadequate time to complete nursing tasks and to support patients emotionally.

The psychological environment

Factor I: Death and dying. This factor appears largely to measure stressful situations resulting from the suffering and death of patients. Four of the seven items that load on this factor are related to the death of a patient. Two other items are associated with patients who fail to improve or who suffer. The performance of painful procedures on patients is also potentially stressful.

Factor III: Inadequate preparation to deal with the emotional needs of patients and their families. The three items that load heavily on this factor concern nurses' attempts to meet the emotional needs of

patients and their families. Feeling inadequately prepared to deal with these psychological and emotional needs may lead to stress.

Factor IV: Lack of staff support. This fourth subscale measures the nurse's assessment of the extent to which opportunities are available to share experiences with other nurses and to vent negative feelings of anger and frustration. The lack of such opportunities may result in stress for nurses.

Factor VII. Uncertainty concerning treatment. Stressful situations also arise where there is uncertainty concerning the treatment of patients. This may develop when the physician fails to adequately communicate to the nurse information concerning a patient's medical condition. When this occurs the nurse does not know what to tell a patient or the patient's family about the medical condition and its treatment. A third potentially stressful situation occurs when a physician is not present in a medical emergency.

The social environment

Factor II: Conflict with physicians. Factor II consists of stressful situations that arise from the nurse's interactions with physicians. The two items that load highest on this factor are criticism by a physician and conflict with a physician. The other items pertain to the nurse's fear of making mistakes concerning treatment in the absence of a physician and disagreement concerning treatment.

Factor V: Conflict with other nurses and supervisors. The items that load on this factor are associated with conflictual situations that arise between nurses and supervisors. Two of the items involve conflict with or criticism by a supervisor; the other three items have to do with conflict with nurses on the same or other hospital units.

Based on these seven factors, subscales were created by adding the individual nurse's scores on the items that loaded on each factor.[2]

Language validity

In the first stage, the scale was translated into Turkish independently by three translators who speak English. All translations were examined and made into a single form by the researchers. In the second stage, the translation of the scale back to English was done by three instructors who are experts in the related field and know both languages well. By comparing the original form of the scale and its back translation, all items were reviewed and it was seen that there was no difference in the intelligibility of the scale items, and the Turkish translation of the scale was completed.

2.4 | Analysis

Statistical evaluation was performed using IBM SPSS 20.0 (IBM Corp, Armonk, NY) and LISREL v8.8 (SSI Inc, IL) package programs. The conformity of numerical variables to normal distribution was evaluated with the Kolmogorov-Smirnov Test. Numerical variables were presented as medians (25th-75th percentile) and frequency (percentages). Pearson's correlation coefficient was calculated for test-retest reliability that was conducted 2 weeks apart for the clarity of the questions. Cronbach α coefficient was calculated separately for the internal consistency of the NSS and subfactors. Exploratory factor analysis (EFA) was performed to test the validity of the scale's structure in Turkish culture. The principal components method and the Varimax factor rotation method were used to define the appropriate factors. The fitness of the sample was tested with the Kaiser-Meyer-Olkin coefficient. The suitability of the data for factor analysis was evaluated with Bartlett's sphericity test. The compatibility between the subfactors created and the original variables were measured by confirmatory factor analysis (CFA). CFA determines the contribution of the questions in the scale to the subfactors. Structural equation modeling (SEM) is a special example of CFA and is performed to determine the relationship between questions and subfactors. SEM method was also used to control the generated structural model. The relationship between the NSS's subfactors was calculated with Pearson's correlation coefficient. $P < .05$ was considered sufficient for statistical significance in two-way tests.

2.5 | Ethical considerations

Permission was obtained from James G. Anderson fort the scale to be used in the study. The written approvals were obtained from the Kocaeli University Non-Interventional Clinical Research Ethics Committee (KÜ GOKAEK 2019/10.40), and the hospitals where the study was to be conducted. Informed consent was obtained from the nurses who agreed to participate in the study. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or National Research Committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

3 | RESULTS

3.1 | Sample characteristics

The sociodemographic characteristics of the nurses participating in the study are given in Table 1.

3.2 | Reliability analysis

Cronbach's α internal consistency coefficient technique is proposed in examining the reliability of Likert type scales. For this purpose, Cronbach's α coefficient was evaluated for NSS. The item-total correlation coefficients were examined to examine the relationship between the scores from the NSS test items and the total score of the test. In this study, Cronbach which measures the internal consistency value of the scale was found to be $\alpha = .928$. Considering the internal consistency value, the questions in the scale were found to be sufficient to measure the stress level of nurses, and thus providing internal consistency of the scale.

Test-retest analysis was performed to ensure that the scale is unchangeable overtime. Two weeks after the first application for the

TABLE 1 Demographic and job characteristics of nurses

Characteristics		n	%
Gender	Female	296	84.8
	Male	53	15.2
Marital status	Married	240	68.8
	Single	109	31.2
Presence of children	Yes	210	60.2
	No	139	39.8
Education level	High school	56	16.0
	Associate degree	41	11.7
	Undergraduate	214	61.3
	Postgraduate and over	38	10.9
Hospital	State hospital	141	40.4
	University hospital	208	59.6
Type of unit	Internal medicine service	24	6.9
	Surgical unit	79	22.6
	Emergency service	21	6.0
	Intensive care unit	65	18.6
	Operating room	36	10.3
	Other units	124	35.6
Working schedule	Daytime	112	32.1
	Shift	237	67.9
Total		349	100.0
	Median (25-75 percentile)		
Age	32.00 (26.00-38.50)		
Working experience in the current clinic	6.00 (2.00-11.00) years		
Total professional experience	6.00 (3.00-13.50) years		

analysis, the nurses ($n = 30$) who completed the questionnaire were reached again, and the scale was applied for the second time. These 30 nurses were excluded from the study in the next stages. The correlation value of the relationship between the test and retest results was $r = .859$ and it was found to be statistically significant at $P < .001$ significance level.

3.3 | Validity analysis

EFA was conducted to test the validity of the NSS. As a result, a structure that explains 59.25% of the total variance of the data structure in the scale including seven factors and 34 items was obtained. In the EFA conducted for the validity of the scale, the smallest and the largest factor loads were found as 0.30 and 0.86.6 in the original scale and 0.32 and 0.79 in our study, respectively. The Kaiser-Meyer-Olkin index was found to be 0.91, and the data were determined to be suitable for factor analysis. A statistically significant result was obtained from Bartlett's sphericity test ($\chi^2 = 5194.01$; $P < .001$), and the scale was divided into seven subfactors to explain stress in nurses. The rotated factor loads matrix is given in Table 2.

3.4 | Confirmatory factor analysis

CFA was performed to test the suitability of the structure revealed by the exploratory factor analysis. According to the CFA, a structural equation model of seven subfactors was formed. Fit measures used to evaluate the validity of the Structural Equation Model were as follows; RMSEA = 0.10 (confidence interval [CI] = 0.098-0.11), AGFI = 0.67, GFI = 0.72. These results show that this model is valid. The seven subfactors were named as "Uncertainty Concerning Treatment-UCT," "Workload-W," "The Death of a Patient-DP," "Conflict with a Physician-CPH," "Conflict with Peers-CPE," "Insufficient Support-IS," and "Suffering Patient-SP" (Graph 1).

The NSS items, subfactors and item statistics, total scale scores, and subfactor scores are given in Table 3.

In Table 4, the relationship between the NSS subfactors was examined using the Pearson correlation coefficient, and a significant relationship between each of the subfactors was found ($P < .001$). Table 4 also gives Cronbach α values showing the contribution of subfactors to the scale. It was determined that the contribution of subfactor of "Suffering Patient" to the scale was lower than other subfactors.

Original scale subfactors and newly created scale subfactors and items are shown in Table 5.

4 | DISCUSSION

Studies on work stress in nurses and its results provide basic information on work stress in nurses worldwide. However, meticulous studies using valid and reliable tools are required to measure the intense work stress in nurses. A scale developed by Gray-Toft and Anderson[2] and originally published in English[12,31,32] offers valid, feasible, and acceptable information for a global assessment of work stress in nurses. In this study, the Turkish validity and reliability of the scale developed by Gray-Toft and Anderson[2] were tested to measure stress levels for nurses.

It was aimed to provide the Turkish literature a scale to obtain accurate, consistent, and valid data. In this context, the data were gathered from two different sample groups of nurses working in a public hospital and a university hospital, and analysis studies were carried out on these data. The results provide an important insight into the various stress factors encountered by nurses working in a state and university hospital.

In this section, the findings of the study conducted to ensure the reliability and validity of the "The Nurse Stress Scale" were discussed under the following headings:

TABLE 2 Factor loading matrix based on varimax rotation method (EFA)

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
Item 15	0.54						
Item 17	0.32						
Item 18	0.50						
Item 23	0.63						
Item 26	0.60						
Item 31	0.51						
Item 32	0.65						
Item 33	0.60						
Item 1		0.44					
Item 25		0.62					
Item 27		0.75					
Item 28		0.72					
Item 30		0.70					
Item 34		0.69					
Item 6			0.58				
Item 8			0.65				
Item 12			0.79				
Item 13			0.64				
Item 21			0.68				
Item 2				0.66			
Item 9				0.76			
Item 10				0.40			
Item 14				0.72			
Item 19				0.57			
Item 5					0.70		
Item 20					0.53		
Item 22					0.55		
Item 24					0.70		
Item 29					0.49		
Item 7						0.76	
Item 11						0.77	
Item 16						0.73	
Item 3							0.73
Item 4							0.59
Exploratory percentage (%)	30.90	6.41	5.95	5.08	3.90	3.68	3.30

Abbreviation: EFA, exploratory factor analysis.

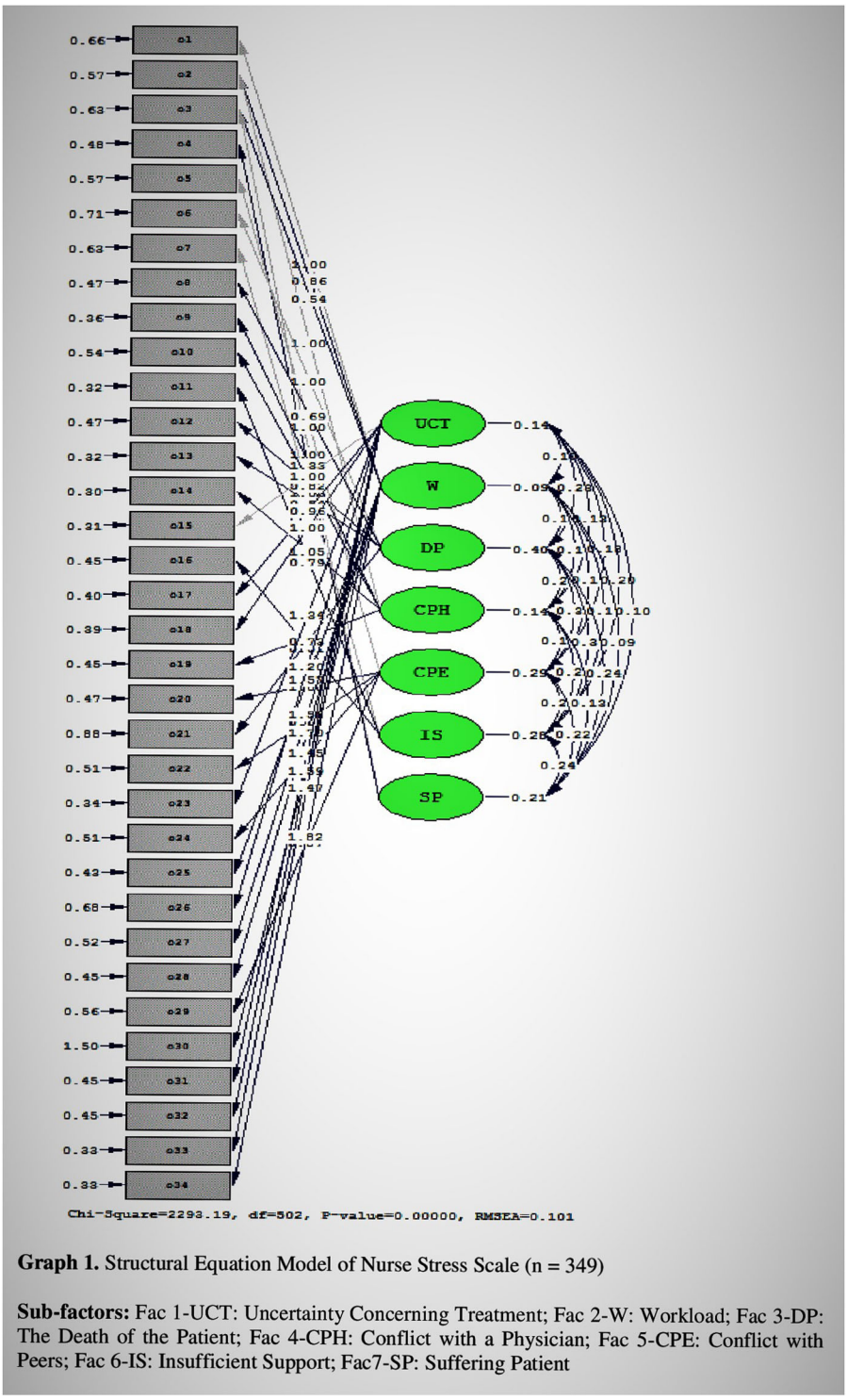

FIGURE 1 Structural Equation Model of Nurse Stress Scale (n = 349). Subfactors: Fac 1-UCT, Uncertainty Concerning Treatment; Fac 2-W, Workload; Fac 3-DP, the Death of the Patient; Fac 4-CPH, Conflict with a Physician; Fac 5-CPE, Conflict with Peers; Fac 6-IS, Insufficient Support; Fac7-SP, Suffering Patient [Color figure can be viewed at wileyonlinelibrary.com]

- Discussion of the results on the reliability of the NSS.
- Discussion of the results on the validity of the NSS.

4.1 | Discussion of the results on the reliability of the NSS

When the test-retest results that test the reliability of the scale were examined, it was found that there was a positive high correlation between the total scores of the first and the last tests. Gray-Toft and Anderson[2] found r = .810 in their study and similarly the same value was found as r = .859 in this study. This result shows that the questions of this scale that measures stress in nurses are understood clearly by nurses and that it is a very reliable scale.

In this study, reliability of the NSS was found as Cronbach α = .928 which validates that it is a highly reliable scale to measure stress in nurses. Cronbach α value was found .89 in the study of Gray-Toft and Anderson.[2] In the study by Bautista et al[32] in which

TABLE 3 The Nurse Stress Scale items and item statistics

Factor	Our study	Mean	SD	Item correlation	
				TSS	SFS
Uncertainty Concerning Treatment (Factor 1)	15. Feeling inadequately prepared to help with the emotional needs of a patient's family	1.97	0.66	0.520	0.326
	17. Inadequate information from a physician regarding the medical condition of a patient	2.48	1.34	0.449	0.245
	18. Being asked a question by a patient for which I do not have a satisfactory answer	2.09	0.67	0.562	0.347
	23. Not feeling prepared enough to help meet the patient's emotional needs	1.93	0.67	0.520	0.303
	26. A physician ordering what appears to be an inappropriate treatment for a patient	2.13	0.86	0.604	0.348
	31. The absence of a doctor during a medical emergency	2.25	0.89	0.645	0.486
	32. Not knowing what a patient or a patient's family ought to be told about the patient's condition and its treatment	2.07	0.79	0.650	0.399
	33. Uncertainty regarding the operation and functioning of specialized equipment	2.08	0.78	0.659	0.344
Workload (Factor 2)	1. Computer breakdown	2.24	0.77	0.418	0.227
	25. Unpredictable staffing and scheduling	2.31	0.80	0.551	0.298
	27. Too many non-nursing tasks required, such as clerical work	2.69	0.93	0.534	0.349
	28. Not enough time to provide emotional support to the patient	2.48	0.85	0.516	0.269
	30. Not enough time to complete all of my nursing tasks	2.52	0.83	0.554	0.290
	34. Not enough staff to adequately cover the unit	2.66	0.88	0.527	0.301
The Death of a Patient (Factor 3)	6. Listening or talking to a patient about his/her approaching death.	2.48	0.91	0.478	0.659
	8. Death of the patient	2.50	0.89	0.508	0.723
	12. The death of a patient with whom you developed a close relationship	2.46	0.92	0.584	0.835
	13. Physician not being present when a patient dies.	2.29	1.05	0.612	0.756
	21. Monitoring the patient's suffering	2.51	0.95	0.618	0.794
Conflict with a Physician (Factor 4)	2. Criticism by a physician	2.29	0.81	0.529	0.352
	9. Conflict with the physician	2.13	0.77	0.605	0.365
	10. Fear of making a mistake in treating a patient.	2.21	0.85	0.535	0.353
	14. Disagreement concerning the treatment of a patient.	2.04	0.70	0.617	0.399
	19. Making a decision concerning a patient when the physician is unavailable.	2.13	0.85	0.594	0.454
Conflict with Peers (Factor 5)	5. Conflict with a supervisor	1.85	0.82	0.611	0.386
	20. Floating to other units that are short-staffed	2.35	0.89	0.662	0.478
	22. Having difficulty working with a particular nurse (or nurses) outside the unit.	2.10	1.04	0.496	0.309
	24. Criticism by a supervisor	2.12	0.85	0.579	0.349
	29. Having difficulty working with a particular nurse (or nurses) in the unit.	2.03	0.76	0.635	0.370
Insufficient Support (Factor 6)	7. Lack of an opportunity to talk openly with other unit personnel about problems on the unit	2.01	0.72	0.435	0.194
	11. Lack of an opportunity to share experiences and feelings with other personnel on the unit	1.97	0.72	0.460	0.191
	16. Lack of an opportunity to express to other personnel on the unit my negative feelings toward patients	1.95	0.72	0.506	0.317
Suffering Patient (Factor 7)	3. Performing procedures that patients experience as painful.	2.46	0.86	0.426	0.407
	4. Feeling helpless in the case of a patient who fails to improve.	2.44	0.83	0.514	0.456

Abbreviations: SD, standard deviation; SFS, Subfactor Score; TSS, Total Scale Score.

TABLE 4 Correlations and Cronbach α values for subfactors of the Nurse Stress Scale

r (p)[a]		Uncertainty Concerning Treatment (Factor 1)	Workload (Factor 2)	The Death of a Patient (Factor 3)	Conflict with a Physician (Factor 4)	Conflict with Peers (Factor 5)	Insufficient Support (Factor 6)	Suffering Patient (Factor 7)	Cronbach α
Factor 1	r	…	0.519	0.505	0.277	0.509	0.404	0.513	0.807
	p		**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	
Factor 2	r		…	0.332	0.358	0.559	0.434	0.645	0.813
	p			**<0.001**	**<0.001**	**<0.001**	**<0.001**	**<0.001**	
Factor 3	r			…	0.280	0.337	0.337	0.356	0.809
	p				**<0.001**	**<0.001**	**<0.001**	**<0.001**	
Factor 4	r				…	0.396	0.291	0.469	0.793
	p					**<0.001**	**<0.001**	**<0.001**	
Factor 5	r					…	0.539	0.610	0.788
	p						**<0.001**	**<0.001**	
Factor 6	r						…	0.493	0.798
	p							**<0.001**	
Factor 7	r							…	0.630
	p								

Note: Bold values are statistically significant.
[a]Pearson correlation analysis.

the reliability of the subscales were examined, "Uncertainty Concerning Treatment" subfactor was $\alpha = .76$ and it was found as $\alpha = .807$ in this study. "Workload" subfactor was $\alpha = .83$ and $\alpha = .813$ in this study; "The Death of a Patient" subfactor was $\alpha = .78$ and $\alpha = .809$ in this study; "Conflict with a Physician" subfactor was $\alpha = .75$ and $\alpha = .793$ in this study; "Conflict with Peers" subfactor was $\alpha = .80$ and $\alpha = .788$ in this study; "Insufficient Support" subfactor was $\alpha = .90$ and $\alpha = .798$ in this study; and "Suffering Patient" subfactor was $\alpha = .60$ and $\alpha = .630$ in this study. Similar to this study, Bautista et al[32] suggested that the contribution of the subfactor of "Suffering Patient" to the scale was found lower than the other subfactors. However, since this subfactor was seen to have contributed to the scale, it was not found appropriate to remove it from the scale. The reason for the low contribution of the "Suffering Patient" subfactor to the scale may be that the nurses did not experience too much stress thanks to making sufficient interventions about the conditions in this subfactor.

4.2 | Discussion of the results on the validity of the NSS

For the construct validity of the scale, EFA analysis was applied to the data of the nursing group. As a result of the analysis, it was seen that the scale was divided into seven subfactors similar to the original scale. The items that constitute the subfactor of "Death of a Patient" in the original scale changed in this study and consisted of five items (questions 6, 8, 12, 13, and 21). In the original scale, the items of "Performing procedures that patients experience as painful" and "Feeling helpless in the case of a patient who fails to improve" which were in the "The Death of a Patient" subfactor in the original scale formed a new subfactor called "Suffering Patient" in this study.

In the original scale, the questions that form the "Insufficient Preparation" subfactor (questions 15, 18, and 23) were included in the "Uncertainty Concerning Treatment" subfactor in this study, and the "Insufficient Preparation" subfactor was excluded from the scale in this study. Other items were found to be gathered under the same factors as the items in the original scale. Nurses are an important force in the delivery of health services, and they are the health professionals who spend the most time with patients.[33] The studies regarding the stressors demonstrated that nurses work more than 40 hours a week[17] and they are unable to adequately meet the needs of patients or to perform nursing care due to the excessive workload.[34] In this study, "Workload" ranked second most stressful situation in nurses after "Uncertainty Concerning Treatment," which proved the result obtained. In addition, conditions such as the doctor's not informing the nurse enough about the medical condition of the patient, the doctor's not being able to communicate adequately with nurses, and the absence of a doctor in case of an emergency are among the uncertainty concerning the treatment. Nurses who encounter such problems do not know how to inform the patient or the family of the patient about the medical condition and treatment. Therefore, it is not surprising that the items in the "inadequate preparation" subfactor regarding the needs of the patient and their family are loaded into the "Uncertainty Concerning the Treatment" subfactor, which suggests that the subfactor questions are related and compatible with each other.

TABLE 5 The Nurse Stress Scale items and item statistics

English version[2]		Turkish version	
Factor	**Items**	**Factor**	**Items**
Factor I: Death and Dying	3. Performing procedures that patients experience as painful		...
	4. Feeling helpless in the case of a patient who fails to improve		...
	6. Listening or talking to a patient about his/her approaching death	Factor 3: The Death of a Patient	6. Listening or talking to a patient about his/her approaching death.
	8. The death of a patient		8. The death of a patient
	12. The death of a patient with whom you developed a close relationship		12. The death of a patient with whom you developed a close relationship
	13. Physician not being present when a patient dies		13. Physician not being present when a patient dies
	21. Watching a patient suffer		21. Watching a patient suffer
Factor 2: Conflict with a Physician	2. Criticism by a physician	Factor 4: Conflict with a Physician	2. Criticism by a physician
	9. Conflict with a physician		9. Conflict with a physician
	10. Fear of making a mistake in treating a patient		10. Fear of making a mistake in treating a patient
	14. Disagreement concerning the treatment of a patient		14. Disagreement concerning the treatment of a patient
	19. Making a decision concerning a patient when the physician is unavailable		19. Making a decision concerning a patient when the physician is unavailable
Factor 3: Insufficient Preparation	15. Feeling inadequately prepared to help with the emotional needs of a patient's family		...
	18. Being asked a question by a patient for which I do not have a satisfactory answer		...
	23. Feeling inadequately prepared to help with the emotional needs of a patient		...
Factor 4: Insufficient Support	7. Lack of an opportunity to talk openly with other unit personnel about problems on the unit	Factor 6: Insufficient Support	7. Lack of an opportunity to talk openly with other unit personnel about problems on the unit
	11. Lack of an opportunity to share experiences and feelings with other personnel on the unit		11. Lack of an opportunity to share experiences and feelings with other personnel on the unit
	16. Lack of an opportunity to express to other personnel on the unit my negative feelings toward patients		16. Lack of an opportunity to express to other personnel on the unit my negative feelings toward patients
Factor 5: Conflict with Peers	5. Conflict with a supervisor	Factor 5: Conflict with Peers	5. Conflict with a supervisor
	20. Floating to other units that are short-staffed		20. Floating to other units that are short-staffed
	22. Difficulty in working with a particular nurse (or nurses) outside the unit		22. Difficulty in working with a particular nurse (or nurses) outside the unit
	24. Criticism by a supervisor		24. Criticism by a supervisor
	29. Difficulty in working with a particular nurse (or nurses) on the unit		29. Difficulty in working with a particular nurse (or nurses) on the unit
Factor 6: Workload	1. Breakdown of computer	Factor 2: Workload	1. Breakdown of computer
	25. Unpredictable staffing and scheduling		25. Unpredictable staffing and scheduling
	27. Too many non-nursing tasks required, such as clerical work		27. Too many non-nursing tasks required, such as clerical work
	28. Not enough time to provide emotional support to a patient		28. Not enough time to provide emotional support to a patient
	30. Not enough time to complete all of my nursing tasks		30. Not enough time to complete all of my nursing tasks
	34. Not enough staff to adequately cover the unit		34. Not enough staff to adequately cover the unit

(Continues)

TABLE 5 (Continued)

English version[2]		Turkish version	
Factor	**Items**	**Factor**	**Items**
Factor 7: Uncertainty Concerning Treatment		Factor 1: Uncertainty Concerning Treatment	15. Feeling inadequately prepared to help with the emotional needs of a patient's family
	17. Inadequate information from a physician regarding the medical condition of a patient		17. Inadequate information from a physician regarding the medical condition of a patient
			18. Being asked a question by a patient for which I do not have a satisfactory answer
			23. Feeling inadequately prepared to help with the emotional needs of a patient
	26. A physician ordering what appears to be inappropriate treatment for a patient		26. A physician ordering what appears to be inappropriate treatment for a patient
	31. A physician not being present in a medical emergency		31. A physician not being present in a medical emergency
	32. Not knowing what a patient or a patient's family ought to be told about the patient's condition and its treatment		32. Not knowing what a patient or a patient's family ought to be told about the patient's condition and its treatment
	33. Uncertainty regarding the operation and functioning of specialized equipment		33. Uncertainty regarding the operation and functioning of specialized equipment
		Factor 7: Suffering Patient	3. Performing procedures that patients experience as painful
			4. Feeling helpless in the case of a patient who fails to improve

The EFA performed to determine the construct validity of the NSS revealed that the scale was in the form of a structure explaining 59.25% of the total variance. In the EFA, the scale was divided into seven subfactors that were named as "Uncertainty Concerning Treatment," "Workload," "The Death of a Patient," "Conflict with a Physician," "Conflict with Peers," "Insufficient Support," and "Suffering Patient." The explanatoriness of the variances of the subfactors were found as 30.90%, 6.41%, 5.95%, 5.08%, 3.90%, 3.68, and 3.30%, respectively. All of the questions contributed significantly to the whole scale which validated that the data structure was suitable for factor analysis. In the study of Gray-Toft and Anderson,[2] the scale was also divided into seven subfactors. Similar to our study, the authors named the subfactors as "Uncertainty Concerning Treatment," "Workload," "The Death of a Patient," "Conflict with a Physician," "Conflict with Peers," "Insufficient Support," and "Insufficient Preparation." The explanatoriness of the variances were found to be as 5.5%, 5.6%, 39.3%, 11.8%, 6.5%, 7.2%, and 9.1%, respectively. The questions included in the subfactor named as "Suffering Patient" in this study were included in the subfactor of the "The Death of a Patient" in the study of Gray-Toft and Anderson,[2] Bautista et al[32] divided the scale into nine subfactors and named them as "Uncertainty Concerning Treatment," "Workload," "The Death of a Patient," "Conflict with a Physician," "Conflict with Peers," "Insufficient Support," "Suffering Patient," "Task Uncertainty," and "Insufficient Preparation," and found the explanatoriness of their variance as 3.82%, 27.89%, 4.79%, 3.25%, 5.39%, 5.07%, 3.05%, 6.84%, and 6.28% respectively. The highest contribution to the scale was provided by the subfactor of the "Death and Dying" in the study of Gray-Toft and Anderson[2] in the Indianapolis-United States, "Death and Dying" in the study of Lee et al,[35] in Taiwan, and "Workload" in the study of Bautista et al[32] in Manila-Philippines. As for this study, the highest contribution to the scale was made by the subfactor of "Uncertainty Concerning Treatment." According to the International Council of Nurses,[36] the most important stress factors of nurses in the work environment are providing care for the fatal patients, the nurses' conflict with their managers, colleagues, and other health care professionals, inability to cope with the emotional needs of patients and their families, a lack of staff support, uncertainty about work intensity and treatment plan. It is seen that this study supports ICN's report in terms of the subscale of "Uncertainty Concerning Treatment" providing the highest contribution to the scale. The difference between the literature results[2,32,35] in providing the highest contribution to the scale can be due to the health system of the countries and the intercultural difference.

SEM is an analysis that examines the contribution of subfactors created by CFA to the model and confirms the results.[37,38] The validity of the model established for NSS was tested with the fit measures, and it was concluded that the factor structure obtained in the structural equation model was compatible. Fit measures of the NSS's Structural Equation Model were found as RMSEA = 0.10 (CI = 0.098-0.11),

AGFI = 0.67, GFI = 0.72, and the results show that the scale can be used to determine stress factors in nurses.

There are differences between the results obtained in this study and the studies in the literature.[2,32,35] These differences are regional differences and the differences resulting from sample selection and the implementation of studies in university/public hospitals.

4.3 | Limitations of the study

This study was carried out only in two hospitals in the city centers of the two provinces. Therefore, the results obtained from this study are applicable only to people surveyed and cannot be generalized to people in all the provinces of Turkey, which is one of the limitations of the study.

5 | CONCLUSION

In this study in which the validity and reliability study of the NSS was carried out, the sample consisted of nurses working in two city hospitals in the provinces of Kırklareli and Kocaeli. Therefore, it is important to reinforce the validity and reliability of the scale with a larger sample group including the private hospital and other hospital groups.

Future research may be directed at changing stress in NSS to include the intensity factor of stress. As advancing technology makes the nurse more stressed, physiological stress measurements confirming this situation can be used for nurses. Additionally, factors such as uncertainty concerning treatment, workload, and patient death that creates the most stress on nurses should be determined in the studies in which the scale is used, and necessary precautions should be taken by informing the responsible nurses and nurse managers in the units where the nurses work. Moreover, it can be suggested to conduct the validity and reliability of the scale in other countries, to investigate the differences between countries and to propose action plans developed by the international nursing organizations according to the obtained results.

5.1 | Implications for nursing practice

- In the nursing profession, stress is an ongoing problem worldwide. However, many situations in the work environment can lead to stress in nurses.
- Studies on stress report that if stress is experienced chronically, it creates physical, spiritual, and social destruction in nurses, negatively affect employees' health, organizational success, and nursing care. Therefore, meticulous studies are required to measure the intense work stress in nurses by using valid and reliable tools.
- It is very important to determine the work-related stresses of nurses with reliable measurement tools in terms of minimizing stress sources, developing positive behaviors, taking appropriate precautions, providing the quality of nursing care of those who expect service from them, the image of their profession as well as maintaining nurses physically and mentally healthy.
- This study provides comprehensive, applicable, and acceptable information for nurses to evaluate work stress. It can also provide a basis for future studies on the larger sample of nurses both in our country and in other countries.

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CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests.

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