Original Article

Assessing psychometric properties of Turkish version of the stressor scale for emergency nurses

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Abstract:

OBJECTIVES: This study was carried out as a methodological study to adapt the stressor scale for emergency nurses to Turkish and to test its validity and reliability.

MATERIALS AND METHODS: Data were collected between April 2019 and December 2019 from 250 emergency nurses working in the emergency department of two different universities and two state hospitals. The scale was reapplied to 40 emergency nurses from the sample group 3 weeks after the first application. For the validity studies of the scale, language validity, content validity, and construct validity studies were used, and for the reliability studies, internal consistency and test–retest reliability methods were used.

RESULTS: It was found that the content validity index of the final form was determined as 0.92 (0.78–1.00) according to expert opinions, the scale explained 69.19% of the total variance in four subdimensions, the Cronbach's alpha value was 0.90, and the test–retest intraclass correlation coefficient value was 0.97.

CONCLUSION: It was concluded that the reliability and validity of the scale was high for Turkish society.

Keywords:

Emergency, emergency department nurses, reliability, stress, validity

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Introduction

Stress is an individual's response to a change in current circumstances or to a threatening situation. Stress is also defined as a sense of mental pressure and tension. Low levels of stress may be desirable and may even be beneficial. The positive aspect of low-level stress is that it can improve biopsychosocial health and improve mental performance. In addition, low level of stress is accepted as an important factor in motivation and adaptation to the environment. However, high levels of stress can cause serious harm to biological, psychological, and social problems and even to human health.[1]

Due to their nature, emergency departments are mixed, crowded, and stress-intensive. Especially when the patient density is high, daily activities of the emergency department create high levels of stress.[2] Emergency nurses, who constitute an important part of the emergency department team, face many incidents such as aggressive patients and relatives, trauma, and life threats. They are constantly witnessing human suffering and deaths. When working under intense stress in overcrowded environments, they compete over time, and they are under the

Box-ED

What is already known on the study topic?

Emergency nurses expose to high levels of stress in emergency departments, which leads to physical and psychological problems such as fatigue and burnout. It is of utmost importance to continuously evaluate the level of stress experienced by emergency nurses.

What is the conflict on the issue? Has it importance for readers?

There is no scale to assess the stress experienced by emergency nurses in the emergency department.

How is this study structured?

This research was designed methodologically and the data were collected from 250 emergency nurses working in the emergency department of two different universities and two state hospitals.

What does this study tell us?

It was concluded that the stressor scale for emergency nurses (SSEN) has high validity and reliability for Turkish culture. However, it is recommended to evaluate the validity and reliability of the scale in larger multicenter sample groups.

pressure of fast and accurate decision-making. On the other hand, emergency nurses experience the pressure of working in harmony with many health professionals as a team. Much is expected of nurses in conflict management. They share the experiences of the patients and their relatives as the first and ever health-care professional in every event. All of these can cause anxiety at various levels and show emotional and physical stress effects in emergency nurses.[3-6]

Exposure to high levels of stress in emergency departments leads to physical and psychological problems such as fatigue and burnout. In addition, the stress experienced by emergency nurses contributes to the decrease in satisfaction with their professions, and this may cause emergency nurses to quit their jobs.[7,8] To prevent such situations, it is of utmost importance to continuously evaluate the level of stress experienced by emergency nurses and to make the necessary interventions against stress in a timely manner. In Turkish, there are generally scales that assess the level of stress experienced by nurses at work. However, there is no scale to assess the stress experienced by emergency nurses in the emergency department. Therefore, the aim of this study was to evaluate the validity and reliability of the Turkish version of the SSEN developed by Yuwanich *et al.* (2018).

Materials and Methods

In this research which was designed methodologically, between April 2019 and December 2019, 250 emergency nurses working in the emergency department of two different universities and two state hospitals agreed to participate in the study. The sample of the study consisted of nurses working in the emergency department who volunteered to participate in the study. In the methodological studies, it is stated that 5–10 times the number of scale items should be taken into account when calculating the sample size;[9] therefore, sampling was conducted with 250 nurses. The data collection forms used in the study were the nurse information form, which included sociodemographic variables related to the individual, and the SSEN.

Nurse information form
It was created by the researchers in accordance with the literature information. The form consists of questions about sociodemographic characteristics such as age, gender, and marital status.

The stressor scale for emergency nurses
SSEN is a form developed by Yuwanich (2018) *et al*. The form consists of 4 subdimensions and 6 questions in the subdimension of life and death, 8 questions in the subdimension of actions and reactions of patients and their relatives, 5 questions in the subdimension of technical and official support, and 6 questions in the subdimension of conflicts. The assessment of the scale was developed from a 5-point Likert form of 5 (very high level) and 0 (certainly not). There were no items in the scale that were evaluated by reverse coding.

Language validity
The scale was first translated from English to Turkish by the researcher to ensure the validity of the scale. Subsequently, it was translated from English to Turkish by five Turkish native speaker faculty members who are fluent in English. As a result of these translations, the most appropriate expressions were determined and the translation of the scale back to English was made by the certified linguist. The original version of the SSEN was compared with the translations and appropriate corrections were made in accordance with expert opinions. Expert who decided on the success of the proof-reading is certified and blind to the team and unfamiliar with the study protocol.

Content validity
The Turkish version of the scale was evaluated by the 10 faculty members working in the faculty of nursing and medicine of a university in terms of

content validity. The experts were asked to evaluate the suitability, comprehensibility, and simplicity of each item in the scale. The final version of the scale was formed after the corrections made according to expert opinions.

Construct validity was determined by exploratory factor analysis. By factor analysis, the features that are highly correlated with each other in the measured structure are clustered under one factor. It is divided into two basic methods: exploratory and confirmatory. In exploratory factor analysis, a hypothesis about the relationship between variables is tested. In confirmatory factor analysis, goodness-of-fit indices were used to examine the factor model of the SSEN. Acceptable values for goodness-of-fit indices are RMSEA <0.08, CFI >0.90, and GFI >0.90. [10-12] As a result of the tests we conducted in our study, it was determined that; RMSEA:0.264, CFI: 0.460, GFI: 0.481. These values indicate that the data are not suitable for confirmatory factor analysis. To perform exploratory factor analysis within the context of construct validity, KMO sample adequacy analysis and Bartlett's test should be performed and a value of 0.60 and above should be obtained.[13] For this reason, at this stage, KMO sample adequacy analysis (KMO: 0.801) and Bartlett's sphericity analysis were conducted to evaluate whether the sample was suitable for factor analysis (X 2 : 6455.99, SD: 300, P < 0.001) and was found significant. In accordance with these results, construct validity was evaluated with exploratory factor analysis. As a result of the analysis, the structure consisting of four factors whose eigenvalue is above 1 explains 69.19% of the total variance. In the literature, it is stated that 50% and above variance rates are accepted as valid.[14]

Cronbach's alpha and Guttman's split-half coefficient were calculated for the evaluation of internal consistency.

Test–retest reliability
When the same measurement tool is applied to individuals at different times, the similarity and consistency of the responses of the individuals to the measurement tool items shows the invariance of that measurement tool. This is a necessary feature for a reliable measuring tool. Invariance is evaluated by test–retest measurements and is one of the most commonly used reliability analyzes.[9] A total of 250 emergency nurses were surveyed. Three weeks after the first interview, 40 emergency nurses were reinterviewed and the SSEN was readministered. The relationship between the scale scores obtained from the test and retest was evaluated using the intraclass correlation coefficient (ICC) to evaluate the test–retest reliability.

Research ethics
To evaluate the validity and reliability of the SSEN,

Table 1: Distribution of sociodemographic data of emergency nurses

	Value
Gender, *n* (%)	
Female	154 (61.6)
Male	96 (38.4)
Marital status, *n* (%)	
Married	115 (46.0)
Single	135 (54.0)
Graduation, *n* (%)	
Vocational nursing high school	32 (12.9)
Associate degree	42 (16.9)
License	162 (64.7)
Master's degree	13 (5.2)
PhD	1 (0.4)
Child status, *n* (%)	
Yes	62 (24.8)
No	188 (75.2)
His/Her duty in the emergency room, *n* (%)	
Clinic nurse	237 (94.8)
Nurse in charge	10 (4.0)
Head nurse	3 (1.2)
Working shift in the emergency department, *n* (%)	
Day shift only	63 (25.2)
Night shift only	11 (4.4)
Mixed shift	176 (70.4)
Place of work, *n* (%)	
State hospital emergency department	92 (36.8)
University hospital emergency department	158 (63.2)
Leveling of the emergency department according to the Ministry of Health, *n* (%)	
Level I	55 (22.0)
Level II	118 (47.2)
Level III	48 (19.2)
Not leveling	29 (11.6)
Age, mean (SD)	30.0 (6.8)
Working month as a nurse, mean (SD)	81.9 (68.3)
Working month as emergency nurse, mean (SD)	63.3 (56.6)

SD: Standard deviation

necessary permissions were obtained from Nuttapol Yuwanich and the Ethics Committee of Medical Research (Decision No.: 19-5.1T/41).

Results

The distribution of the ED nurses in the study is summarized in [Table 1]. The content validity index (CVI) of the final form was determined as 0.92 (0.78–1.00) according to expert opinions.

Construct validity
As a result of the conformity analysis performed for confirmatory factor analysis, it was determined that the data were not suitable for confirmatory factor analysis (root mean square error of approximation [RMSEA]: 0.264, comparative fit index [CFI]: 0.460, and

goodness-of-fit index [GFI]: 0.481). Therefore, confirmatory factor analysis could not be performed and only exploratory factor analysis was performed. To perform exploratory factor analysis, Kaiser–Meyer–Olkin (KMO) sample adequacy analysis (0.801) and Bartlett's test of sphericity analysis were conducted to evaluate whether the sample was suitable for factor analysis (χ^2: 6455.99, standard deviation [SD]: 300, $P < 0.001$). As a result of the principal component analysis, it was seen that the items of the scale were collected under four factors. Four factors explain 69.19% of the total variance.

Internal consistency

The Cronbach's alpha value, which shows the reliability coefficient of the SSEM, for life and death situation subdimension was 0.91, patients' and families' actions and reactions subdimension 0.79, technical and formal support subdimension 0.76, conflicts subdimension 0.74, and overall Cronbach's alpha value 0.90 [Table 2].

The Guttman split-half coefficient of the SSEN was 0.64; the Spearman–Brown coefficient was 0.65. The Cronbach's alpha value of the first half was 0.89; Cronbach's alpha value of the second half was 0.86; and the correlation between the two halves was 0.48 [Table 3].

Test–retest reliability

ICC results of the first and second application of all items, life and death situation subscales were 0.98, patients' and families' actions and reactions were 0.96, technical and formal support were 0.96, and the conflicts were 0.96, and the overall ICC value of the scale was 0.97 [Table 4].

Discussion

In our study, we evaluated the validity and reliability of the Turkish version of the SSEN. In order for a scale used in one culture to be used in another culture, the process should not be a "translation" process, but an "adaptation" process, because translating one scale into another language significantly changes the nature of that scale. This inevitable change comes from differences in conceptualization and narration. To minimize the differences, the items of the scale should be examined carefully. To be meaningful in the translated language, it is necessary to make the necessary transformations and standardize the individuals using the translated language according to the norms. Translating the scale from the original language to the target language and back translation techniques are the first and most used step in scale adaptation.[9,15]

Translation and back translation studies on the language validity of the stressor scale for emergency

Table 2: Cronbach's alpha value of the stressor scale for emergency nurses

Sub-dimensions	Cronbach's alpha
Life and death situation	0.91
Patients' and families' actions and reactions	0.79
Technical and formal support	0.76
Conflicts	0.74
Total	0.90

Table 3: Semi-test reliability analysis of stressor scale for emergency nurses

Analysis	Result
n	250
Number of items	25
Guttman split-half	0.64
Spearman-Brown	0.65
13-item first half Cronbach's alpha value	0. 89
12-item second half Cronbach's alpha value	0.86
Correlation between two halves	0.48

Table 4: Stressor scale for emergency nurses test-retest reliability

	ICC (minimum-maximum)
Life and death situation	0.981 (963-989)
Patients' and families' actions and reactions	0.961 (927-979)
Technical and formal support	0.962 (921-977)
Conflicts	0.969 (941-983)
Total	0.970 (945-984)

ICC: Intraclass correlation coefficient

nurses (SSEN) were conducted according to the MAPI Research Institute guidelines.[16] CVI was used to evaluate the scope validity. A CVI score above 0.80 indicates that the validity of the scope is achieved.[17,18] In this study, CVI was determined as 0.92 (0.78–1.00). This value indicates that the content validity is high.

Factor analysis is frequently used in nursing research to evaluate construct validity.[19] As a result of the analysis, the structure consisting of four factors whose eigenvalue is above 1 explains 69.19% of the total variance. In the literature, it is stated that 50% and above variance rates are accepted as valid.[14]

The Guttman split-half reliability coefficient of the SSEN was 0.64. When the reliability coefficients are close to 1, it can be said that the reliability of the scale is highly reliable in terms of two half test reliability results according to the literature information supporting high reliability.[20]

The reliability coefficient that can be considered sufficient in a measuring instrument should be as close to 1 as possible. If the alpha coefficient is <0.40, the measurement tool is not reliable, low reliability between

0.40 and 0.59, highly reliable between 0.60 and 0.79, and highly reliable between 0.80 and 1.00.[21] The original study of the SSEN developed by Yuwanich *et al*. was conducted on 405 emergency nurses. The Cronbach's alpha value for each factor of the scale was found to be between 0.89 and 0.93.[22] In our study, Cronbach's alpha value of the scale was found to be 0.90. This value is in parallel with the original development study of the scale and it is stated that it is very reliable in the literature.

To test the invariance of the SSEN against time, 40 nurses were readministered at 3-week intervals and the results were evaluated using ICC analysis. In the methodological studies, it is reported that the number of individuals to be retested should be at least 30 in testing invariance against time.[23] In this study, retesting was performed on 40 individuals and therefore it was accepted as a sufficient number. The ICC value varies between 0.00 and 1.00, reliability is good for values between 0.60 and 0.80, and values above 0.80 indicate that the excellent degree.[24] In the original study by Yuwanich *et al*., the ICC value of the scale was found to be 0.89.[22] In our study, it was found to be 0.97. This value shows that the test–retest values of the scale are excellent in parallel with the original study.

Limitation

The findings of this study come from 250 emergency nurses working in the emergency department of two different universities and two state hospitals. These findings may differ in larger sample size and other emergency departments such as emergency departments of private hospitals.

Conclusion

According to the results of all statistical analyzes conducted to evaluate the validity and reliability of the SSEN, it was concluded that the SSEN was a high validity and reliability tool for Turkish culture.

In line with this result, it is recommended to evaluate the validity and reliability of the scale in larger multicenter sample groups.

Author Contribution Statement
Concept: SH, GK; Design: SH; Supervision: FSA; Resources: SH, GK; Materials: SH, GK; Data Collection and/or Processing: SH, GK; Analysis and/or Interpretation: SH, GK; Literature Search: SH, GK; Writing Manuscript: SH; Critical Review: SH, GK, FSA.

Conflicts of interest
None declared.

Ethical Approval
Ethics Committee of Medical Research (Decision No.: 19.5.1T/41).

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