Meltem Ulus,Aylin Durmaz Edeer

# The Strain of Care for Delirium Index: Validity and Reliability Study

Deliryum Bakım Zorluğu Ölçeği: Geçerlik ve Güvenirlik Çalışması

Received/Geliş Tarihi : 15.01.2023 Accepted/Kabul Tarihi : 13.12.2023

Meltem Ulus Dokuz Eylül University, Health Sciences Institute,

Department of Surgical Nursing, İzmir, Turkey

Aylin Durmaz Edeer Dokuz Eylül University Faculty of Nursing, Department of Surgical Nursing, İzmir, Turkey

Meltem Ulus (⊠),

Dokuz Eylül University, Health Sciences Institute, Department of Surgical Nursing, İzmir, Turkey

E-mail : meltemm.ulus@gmail.com Phone : +90 507 286 17 93 ORCID ID : orcid.org/0000-0001-9779-8597 **ABSTRACT** *Objective:* Care burden threatens the physical, psychological, emotional, and functional health of caregivers. Caring for patients with delirium leads to stress, increased emotional load and workload in nurses. The strain of care for delirium index (SCDI) was developed to measure the subjective burden of nurse's experience in the care of patients with delirium. The aim of this study is to examine the Turkish validity and reliability of the "The strain of care for delirium index". *Materials and Methods:* This study was conducted in a methodological and cross-sectional type. The sample consisted of 102 nurses working in the intensive care unit for at least 6 months.

*Results:* The goodness-fit indices obtained in the confirmatory factor analysis were at an acceptable level. In the explanatory factor analysis of the scale, factor loads were found to be between 0.343 and 0.865. Item-to- total correlation coefficients ranged from 0.298 to 0.627 and above 0.20 for each item.

*Conclusion:* Reliability refers to consistency between independent measurements of the same thing. In this study, Cronbach's alpha coefficient and item-total correlations were used to measure reliability. In this study, the Cronbach's alpha coefficient was 0.89. Therefore, SCDI has been accepted as a highly reliable measurement tool. In the reliability analysis of the original index, the Cronbach's alpha coefficient was found to be 0.88. The Turkish version of the SCDI is a valid and reliable scale to evaluate the care difficulty of nurses caring for patients with delirium.

Keywords: Care burden, critical care, delirium, nursing, reliability and validity

ÖZ Amaç: Bakım yükü, bakım verenlerin fiziksel, psikolojik, duygusal ve fonksiyonel sağlığını tehdit eder. Deliryumlu hastalara bakım vermek hemşirelerde strese, duygusal yükün ve iş yükünün artmasına neden olur. Deliryum bakım zorluğu ölçeği, deliryumlu hastaların bakımında hemşire deneyiminin öznel yükünü ölçmek için geliştirilmiştir. Bu çalışmanın amacı "Deliryum Bakım Zorluğu Ölçeği (SCDI)" nin Türkçe geçerliğini ve güvenirliğini incelemektir.

*Gereç ve Yöntem:* Bu çalışma metodolojik ve kesitsel tipte yapılmıştır. Örneklemi yoğun bakım ünitesinde en az 6 aydır çalışan 102 hemşire oluşturmuştur.

*Bulgular:* Doğrulayıcı faktör analizinde elde edilen iyilik uyum indeksleri kabul edilebilir düzeydedir. Ölçeğin açıklayıcı faktör analizinde faktör yükleri 0,343- 0,865 arasında bulunmuştur. Madde toplam puan korelasyon katsayıları 0,298-0,627 arasında ve her bir madde için 0,20'nin üstünde bulunmuştur.

Sonuç: Güvenilirlik, aynı şeyin bağımsız ölçümleri arasındaki tutarlılığı ifade etmektedir. Bu çalışmada güvenirliği ölçmek için Cronbach's alpha katsayısı ve madde-toplam korelasyonları kullanılmıştır. Çalışmanın Cronbach's alpha katsayısı 0.89'dur. Bu nedenle SCDI oldukça güvenilir bir ölçme aracı olarak kabul edilmiştir. Orijinal indeksin güvenirlik analizinde Cronbach alfa katsayısı 0,88 olarak bulunmuştur. SCDI'nin Türkçe versiyonu deliryumlu hastaya bakım veren hemşirelerin bakım zorluğunu değerlendirmede geçerli ve güvenilir bir ölçektir.

Anahtar Kelimeler: Bakım yükü, yoğun bakım, deliryum, hemşirelik, güvenilirlik ve geçerlik

# Introduction

Delirium is an acute brain syndrome in which mental functions are generally reversible, with a sudden, fluctuating course in consciousness, perception, thought, sleep-wake cycle, which disrupts brain functions due to an organic cause, and the brain is widely affected in a short time. (1, 2)

In meta-analysis and systematic reviews conducted in different patient groups, it was stated that the incidence of delirium increased up to 52%.(3-5) In the literature, it is stated that delirium causes prolonged mechanical ventilation, intensive care unit (ICU) and hospital stay, increased mortality, and long-term cognitive impairment. (6, 7) Patients may experience disturbing symptoms of psychosis, such as delusions, hallucinations, and altered mood. Patients with delirium tend to fluctuate cognitively and behaviorally. Caregivers to patients with delirium have great difficulty managing these conditions.(8) Studies have shown that delirium causes care difficulties for nurses.(9, 10)

Caring for patients with delirium leads to stress, increased emotional load and workload in nurses.(11) Care burden defines as a multidimensional response to the negative evaluation and perceived stress resulting from the care of the patient. Care burden threatens the physical, psychological, emotional, and functional health of caregivers. (12, 13) In the literature, there are two studies evaluating the care difficulties of nurses who care for patients with delirium.(10, 14) The strain of care for delirium index (SCDI) was developed to measure the subjective burden of nurse's experience in the care of patients with delirium.

This study aimed to investigate the Turkish validity and reliability of the "The strain of care for delirium index" developed to measure the subjective burden of nurse's experience in the care of patients with delirium.

# **Materials and Methods**

This study was methodological and cross-sectional.

#### **Study Sample**

We used matched sampling method in the selection of the sample. It is recommended that the sample size be 5–10 times the number of items in the scale.(15-17) Therefore, the sample size was planned to at least 100 intensive care nurses. The data were collected from the nurses who worked in the ICU of training and research hospital for at least 6 months between March and May 2022 using a questionnaire collection method. A sample of the study formed 102 nurses who agreed to participate in the study.

## **Data Collection Tools**

We collected data with the "introductory information form" and "SCDI".

a. Introductory Information Form: It includes the descriptive characteristics of nurses such as gender, age, working years. This form, developed by the researchers in line with the literature, consists of 8 questions.

b. SCDI: This scale was developed by Milisen et al. The aim of the scale was to determine the difficulties experienced by nurses while giving care to patients with delirium. The scale consists of 20 items and is a four-point Likert scale. The scale consists of 4 sub-dimensions as " hypoactive behavior", " hypoalert behavior", "fluctuating course and psycho-neurotic behavior" and "hyperactive/ hyperalert behavior". The total score ranges from 20 to 80, with higher scores indicating greater difficulty coping with delirium behavior. The four-factor index explains 61.51% of the total variance and the internal consistency Cronbach's alpha reliability coefficient is 0.88.(18)

# **Data Collection**

We applied an introductory information form and an adapted scale to the nurses participating in the study. We applied the scale for the second time after 6 weeks to evaluate the invariance of the scale. It took an average of 1 min to answer the scale.

#### **Statistical Analysis**

Data Statistical Package for social Sciences 22.0 (SPSS, Inc. Chicago, IL, USA) and AMOS 21. Content validity of the scale was examined with the Polit and Beck Content Validity Index by obtaining expert opinions.(19) Construct validity of the scale; analyzed by exploratory factor analysis (EFA) and confirmatory factor analysis (CFA).(16, 20) In the reliability of the scale, item-total correlations were determined, and the internal consistency of the scale and its sub-dimensions was examined with the Cronbach's alpha reliability coefficient. (16, 21, 22)

Test-retest measurement results showed a normal distribution, the difference between the mean scores obtained from the two measurement results, the invariance vs. time, was examined with the "t-test independent groups". The Hotelling T2 test was used to evaluate whether the participants' responses to the scale items were equal (Figure 1).



Figure 2. CFA of the delirium difficulty-to-care scale

#### **Ethical Approval**

Ethics committee approval was obtained from a university non-interventional clinical research ethics committee (decision number 0399 and decision date: 21.09.2021). Written institutional permission was obtained from a training and research hospital and nurses working in ICU were informed about the purpose and methods of the study, and verbal and written informed consent was obtained from each participant.

# Results

# **Characteristics of the Participants**

The mean age of nurses was found to be  $26.69 \pm 4.48$  years; moreover, 78.4% were female, and 70.6% had undergraduate education. The nurses participating in the research have been working as nurses for a minimum of 6 months and a maximum of 22 years and have been working in the ICU for at least 6 months and maximum 16 years (Table 1). 75.5% of the participants stated that they received education on delirium.

nurses (n=102)						
	<b>x</b> ± SD	Range				
Gender	n (102)	%				
Woman	80	78.4				
Male	22	21.6				
Educational status						
High school	14	13.7				
Associate degree	9	8.8				
License	72	70.6				
Graduate	7	6.9				
ICU						
Cardiovascular surgery ICU	26	25.5				
Anesthesia and reanimation ICU	33	32.4				
Neurosurgery ICU	10	9.8				
General surgery ICU	12	11.8				
Neurology ICU	5	4.9				
Internal medicine ICU	10	9.8				
Coronary ICU	6	5.9				
	<b>x</b> ±SD	Range				
Age	26.69±4.48°	22-43				
Professional working year	3.86±4.04ª	6 months-22 years				
Years of work in an ICU	2.98±3.40°	6 months-16 years				
ICU: Intensive care unit. SD: Standard deviation. <sup>a</sup> Values given are mean ± SD						

#### **Validity Analysis**

Examination of Content-language Validity

## Language Validity

First, two native speakers translated the scale from English to Turkish to ensure the language validity of the "SCDI." Second, two experts who were fluent in both the Turkish and English languages and cultures and did not see the English version of the original scale translated the scale from Turkish to English. Third, the English-Turkish and Turkish-English translations were checked, and they were found to be similar, and the Turkish version of the scale was created.

# **Content Validity**

To analyze the content validity, eight specialists, who are physicians, nurses, and faculty members in the field of cardiovascular surgery and psychiatry, were asked to give their opinions on the applicability and comprehensibility of the scale items translated into Turkish. Experts evaluated each item on scale for content validity by scoring between 1 and 4 (1: The item is not suitable, 2: The item should be seriously reviewed, 3: The item should be reviewed, 4: Appropriate).

Scores were given by the experts to the items of the "SCDI" were analyzed with the Polit and Beck Content Validity Index. Content Validity Index was calculated for both the items and scale. The Content Validity Index of the scale: 1 and Item Content Validity Index: 1. It has been determined that there is a consensus among the experts. The researchers made necessary corrections in the scale items according to the suggestions of the experts. Then, the scale was evaluated statistically without removing the item.

#### **Pilot Application**

After the language and content validity of the scale, a pilot application was conducted. It was conducted with 20 intensive care nurses, who have the characteristics of the sample and 10% of the sample number.(23) Data from the pilot application were excluded from the analysis of this study. In line with the suggestions the root of the question was changed from "...how is it for you to take care of patients?" to "...how do you deal with patients?" Additionally, the 12th question was edited as "How do you deal with patients who go back and forth between conscious and unconscious periods?" After these revisions, the final version of the scale was applied to the sample group.

## **Construct Validity:**

EFA and CFA were performed for the construct validity of the scale.

EFA: EFA was conducted to determine the construct validity of the "SCDI" and to determine the factor structure. Therefore, direct oblimin method, which is obligue rotation methods was used because there was a relationship between the principal components and factors.(24) Sample adequacy was evaluated with Kaiser-Meyer-Olkin (KMO) value in EFA. KMO value of 0.831, Bartlett's Test X2 (190) =943.577 and p<0.05 (significant). It was determined that the SCDI, which consists of 20 items and a structure with

Table 2. Factor loads of scale items	
Scale items	Factor loadings
1. How do you deal with patients who are withdrawn or are unusually quiet?	0.606
2. How do you deal with apathetic/disinterested or unmotivated patients?	0.750
3. How do you deal with patients with reduced motor activity?	0.636
4. How do you deal with patients who lack knowledge or understanding of their disease/condition?	0.343
5. How do you deal with patients who have difficulty concentrating and are easily distracted?	0.589
6. How do you deal with patients who speak slowly or hesitantly?	0.622
7. How do you deal with patients who make little eye contact?	0.573
8. How do you deal with patients who call someone they know by a different name?	0.865
9. How do you deal with patients who are talking to people not actually present?	0.860
10. How do you deal with patients who engage in repetitive behaviors?	0.679
11. How do you deal with patients who have inconsistent speech?	0.640
12. How do you deal with patients who go back and forth between conscious and unconscious periods?	0.430
13. How do you deal with patients whose sleep/wake cycle is disrupted?	0.597
14. How do you deal with restless or agitated patients?	-0.633
15. How do you deal with patients making noise or shouting?	-0.788
16. How do you deal with patients who are irritable?	-0.805
17. How do you deal with patients who have increased amounts of motor activity?	0.504
18. How do you deal with uncooperative or difficult-to-manage patients?	-0.631
19. How do you deal with patients trying to get out of bed inappropriately?	-0.842
20. How do you deal with patients pulling tubes, dressings, and catheters, etc.?	-0.801

4 sub-dimensions (factors), explained 59.84% of the total variance.

The factor loads of the scale items were found to be between 0.343 and 0.865 (Table 2).

CFA: CFA was performed for the construct validity of the scale. CFA, the results of the fit statistics and modification index were examined without making any limitations on the model or adding new connections (Figure 2).

[(X2(df:164, N=102) =313.223, p:0.000, RMSEA=0.095, GFI=0.775, AGFI=0.711, CFI=0.820, X2/df=1.91] of the scale were obtained. p=0.000 was found (Table 3).

#### Reliability

# **Internal Consistency**

Cronbach's Alpha Coefficient

SCDI, Cronbach's Alpha coefficient, was found to be  $\alpha$ =0.892. Cronbach's Alpha coefficient for hypoactive,



Figure 1. Scale analysis of validity and reliability

Table 3. Examination of the CFA compliance of the delirium difficulty-to-care scale					
DFA Model Fit Indices	The expected values	SCDI			
Minimum Fit Function chi-square (x 2)	v2 / df <5	1.91			
Degrees of Freedom (df)	xz/ui<5				
Root Mean Squared Error of Approximation (RMSEA)	<0.08	0.095			
Root Mean Square Residual (RMR)	<0.08	0.045			
Comparative Fit Index (CFI)	>0.90	0.82			
Goodness of Fit Index (GFI)	>0.90	0.775			
Adjusted Goodness of Fit Index (AGFI)	>0.90	0.711			

hypoalert, fluctuating course and psycho-neurotic and hyperactive/hyperalert behavior sub-dimensions 0.675, 0.711, 0.828 and 0.863 were found respectively (Table 4).

The mean SCDI score was  $55.50 \pm 7.94$  and the scale sub-dimension mean score was  $7.36\pm1.58$ ,  $9.77\pm1.91$ ,  $13.92\pm2.73$ , and  $24.45\pm4.03$ , respectively (Table 4).

# **Item-to-total Score Analysis**

Item-to-total score correlation values of SCDI were found to be between 0.298 and 0.627 and above 0.20 for each item. The item-total score correlation coefficients of the subdimensions were between 0.353 and 0.788.

# **Invariance Analysis**

Test-retest Reliability Coefficient (Test-retest reliability coefficient): SCDI was administered to 102 nurses working in the ICU twice, with an interval of 6 weeks. It was determined that there was no statistical difference between the two measurement results. (p=0,526) (p>0.05) (Table 5).

The test-retest total score average correlation coefficient of the scale was 0.985, and the subscale-total score correlation coefficients were 0.972, 0.968, 0.973 and 0.973, respectively and were significant (p:0.000). In the first and second applications, positive, a very strong and significant relationship was found between the scale and the subdimension total scores (Table 5).

#### **Response Bias**

Scale Response bias; The Hotelling T2 test was used to evaluate whether the participants responded to the scale items in line with the researcher's expectations. Hotelling T2=234.579 p=0.000, the scale did not have a response bias.

# Discussion

#### Linguistic Validity:

Firstly, two native speakers of Turkish translated SCDI from English into Turkish for linguistic validity of the SCDI. Secondly, English by two experts, who were fluent in both Turkish and English languages and cultures but did not see the English version of the original scale, translated it back to English to test whether the Turkish version met the same meaning. In the third stage, the English-Turkish and Turkish-English translations were checked and found to be similar, and the Turkish form of the scale was created. Health professionals who are familiar with the terminology of the translated scale and who have experience in interviewing/

dimensions							
SCDI and its sub-dimensions	x <sup>2</sup> ± SD	SE	median	min.	max.	г	۵
1. Sub-dimension: hypoactive behavior	7.36±1.58	0.15	7.00	3	11	2,511	0.675
2. Sub-dimension: hypoalert behavior	9.77±1.91	0.18	10.00	4	14	3,662	0.711
3. Sub-dimension: fluctuating course and psycho -neurotic behavior	13.92±2.73	0.27	14.00	7	20	7,499	0.828
4. Sub-dimension: hyperactive/hyperalert behavior	24.45±4.03	0.39	24.00	9	32	16,290	0.863
SCDI total	55.50±7.94	0.78	56,00	35	75	63,064	0.892

Table 4. Cronbach's alpha reliability coefficient and sub-dimension analysis results of the delirium difficulty of care scale and its sub-

Table 5. Test-retest mean scores of SCDI and its sub-dimensions

	The score ave	Analysis results				
Scale and sub-dimensions	Test (n=102) x±SD	Retest (n=102) x±SD	t	₽ <sup>ь</sup>	r	<b>p</b> <sup>c</sup>
SCDI	55.50±7.94°	55.59±8.06°	-0.636	0.526	0.985	0,000
1. Sub-dimension: hypoactive behavior	7.36±1.58	7.34±1.58	0.533	0.595	0.972	0,000
2. Sub-dimension: hypoalert behavior	9.77±1.91	9.73±1.90	0.815	0.417	0.968	0,000
3. Sub-dimension: fluctuating course and psycho -neurotic behavior	13.92±2.73	13.91±2.70	0.155	0.877	0.973	0,000
4. Sub-dimension: hyperactive/ hyperalert behavior	24.45±4.03	24.60±4.13	-1,665	0.990	0.973	0,000
Total	55.50±7.94	55.59±8.06	-0.636	0.526	0.985	0,000
SD: Standard deviation; <sup>c</sup> p<0.001; <sup>b</sup> p>0.05; <sup>a</sup> Values are expressed as mean ± SD						

data collection should be involved in the translation process of the scale. Translators should consider the cultural, psychological, and grammatical differences in both languages. In the initial translation and back translation, the emphasis should be on conceptual and cultural equivalence rather than linguistic equivalence.(25) The back translation was compared with the original SCDI by the authors of this article and no changes were made to the Turkish version as it was found to be compatible with the original scale. The language validity criterion of the scale was provided in line with the literature.

Content validity: Content validity is the extent to which the scale items of the construct to be measured represent the construct to be measured.(26, 27) For this, the applicability and comprehensibility of the scale items translated into Turkish depend on expert evaluations and choosing the right number of experts is very important.(28) It is recommended to obtain expert opinion on content validity from at least three and at most 10 experts.(19) So, expert opinion was obtained from 8 specialist who are experts in delirium and intensive care. Scores given by the experts to the items of the SCDI were analyzed with the Polit and Beck Content Validity Index. For content validity, the Scale Content Validity Index: 1 and the Item Content Validity Index:

1. If an expert opinion is obtained from 6-10 people, it is recommended that the item and scale content validity index be 0.80 and above. It has been determined that there is a consensus among the experts.(23) The researchers made necessary corrections in the scale items according to the suggestions of the experts. The pilot study was conducted with 20 intensive care nurses, who have the characteristics of the sample and 10% of the sample number.(23) In the pilot study, participants are asked to read the question aloud and give a brief explanation about the meaning of each item. If an item is not easily understood, the respondent's opinion should be sought on how the question could be expressed in another way. In this way, it should be ensured that the substance is understood in the same way by every individual.(25) According to the suggestions of the pilot study participants, we changed the roots of the questions, and edited the 12th question.

#### Construct validity: EFA and CFA

EFA is the researcher is trying to reveal the structure between variables, while CFA is suitable for situations where there are hypotheses about the structure in question based on pre-established or previous research and researchers are interested in testing them. The Bartlett test is used to determine whether the correlation coefficients are

significant in EFA.(29) KMO was found to be 0.831 and this value showed that the sample size was "perfect" for factor analysis. Also, Bartlett's Test  $\chi^2$ (df:190) =943.577 and p<0.05 (significant), indicating that the correlation between items was large enough for EFA.(17)

In the validity analysis of the scale, the total correlation coefficient was 0.88%. The factor loads of the scale items were between 0.343 and 0.865. It is recommended that the factor loads of the items be at least 0.32.(20) Factor loadings explaining the relationship between the factors show that the items are frequently highly correlated (Table 2). It is used to determine the degree of conformity of the sub-dimensions determined using EFA to the sub-dimensions created with the help of hypothesis. It also determines the extent to which the scale items are represented by the determined factors.(30) (Aytac, 2012). [(X2(df:164, N=102) = 313.223, p:0.000, RMSEA=0.095, GFI=0.775, AGFI=0.711, CFI=0.820, X2/df=1.91] of the scale were obtained (Table 4). p=0.000 was found.

Order to reach harmony between the matrices, the p value should be meaningless. The sample size greatly affects the p-value of the  $\chi^2$  statistic and therefore results in the rejection of the model unless there are countless samples. (31-33) In other words, the  $\chi^2$  value is generally significant in practice. Therefore, instead, the value obtained by dividing 2 by the df can be considered.(31) If  $\chi^2/(df)$  is 5 or less, it indicates that the model has an acceptable goodness of fit. (31, 32) Our 2/(df) value was 1.91 and has a good goodness of fit.

RMSEA is the square root of the approximate means. It takes values between 0 and 1. If the RMSEA value is below 0.05, it shows a perfect fit, and below 0.08, it shows acceptable fit. If the values are between 0.08–0.10, they show moderate agreement, while values below 0.10 are not considered acceptable.(31, 32, 34, 35) RMSEA=0.095 and shows moderate agreement. As RMR value approaches zero, the tested model shows better goodness of fit.(31, 32, 34)

RMR=0.045, the model shows better goodness of fit. CFI gives the difference of the model established from the absence model (null), assuming that there is no relationship between the variables. This is a model that predicts that there is no relationship between the variables. Its value varies between 0 and 1. As the value gets closer to 1, it is concluded that the degree of goodness of fit increases and simultaneously, the model with high value CFI exhibits a strong fit.(31-34) CFI=0.82, goodness of fit was not as good as expected.

GFI is a goodness-of-fit index and indicates to what extent the covariance matrix in the sample is measured by the model. The larger the sample size, the higher is the GFI value. Although its general value is between 0 and 1, a GFI exceeding 0.90 is considered a good model indicator.(32, 36) GFI=0.775, goodness of fit was not as good as expected.

AGFI is the adjusted goodness of fit index. It is an index used to make up for the deficiency of the GFI test in high sample volume. Its value ranges from 0 to 1 and must be above 0.90.(31, 32, 34, 36) AGFI=0.711, goodness of fit was not as good as expected.

According to the DFA result, 2/(df) was found to have a good and moderate goodness of fit according to the RMSEA and RMR values. However, it was that the goodness of fit in CFI, GFI and AGFI values was not as good as expected.

# **Reliability:**

Reliability refers to consistency between independent measurements of the same thing. In this study, Cronbach's alpha coefficient and item-total correlations were used to measure reliability.(23) In this study, the Cronbach's alpha coefficient was 0.89. Therefore, SCDI has been accepted as a highly reliable measurement tool.(21, 22) In the reliability analysis of the original index, the Cronbach's alpha coefficient was found to be 0.88.(18)

Test-retest reliability is the power of a measurement tool to provide consistent results from application to application and to show invariance over time.(37) Test-retest reliability is usually estimated by calculating the.(38)

The test-retest total score average correlation coefficient of the scale was 0.985 and the subscale-total-score correlation coefficients were 0.972, 0.968, 0.973, and 0.973, respectively, and were significant (p :0.000) (Table 5). Very strong correlation between the two measurement values indicates greater temporal stability or test-retest reliability. (38) The first and second application scale total and subdimension total point between a positive direction, very strong and significant a relationship to be this shows that the scale has an invariance feature against time and is consistent.

The reliability and validity studies of the scale were carried out only with intensive care nurses.

# Conclusion

It was concluded that the SCDI is a valid and reliable tool for examining the burden of care in intensive care nurses care for patients with delirium. In line with the data obtained from this scale, it is thought that it will help develop research order to reduce or prevent the difficulty of nurses giving care to patients with delirium. The effectiveness of the interventions planned to reduce the burden of nurses in the care of these patients can be evaluated with this scale. It is thought that the quality of patient care will increase when the care burden of the nurses who care for the patient with delirium is reduced.

Acknowledgements: The authors would like to thank the intensive care nurses who agreed to participate in the study. The authors would like to thank specialist nurses, psychiatrists, associate professors and assistant professors who contributed to the test with their language translation and expert opinions for their contributions to the study.

## Ethics

**Ethics Committee Approval:** Ethics committee approval was obtained from Izmir Katip Celebi University non-interventional clinical research ethics committee (decision number 0399 and decision date: 21.09.2021) and written

institutional permission was obtained from Atatürk Training and Research Hospital.

**Informed Consent:** Nurses were informed about the study and written informed consents were obtained.

Peer-review: Externally peer-reviewed.

## **Authorship Contributions**

Surgical and Medical Practices: M.U, Concept: M.U., A.D.E., Design: M.U., A.D.E., Data Collection and Process: M.U., Analysis or Interpretation: M.U., A.D.E., Literature Search: M.U., A.D.E., Writing: M.U., A.D.E.

Conflict of interest: No conflict of interest was declared by the authors.

**Financial Disclosure:** The authors declare that this study received no financial support.

# References

- Çam O, Engin E. Ruh Hastalıkları Hemşireliği Bakım Sanatı. 1. ed. İstanbul: İstanbul Tıp Kitabevi; 2014.
- Fan Y, Guo Y, Li Q, Zhu X. A review: nursing of intensive care unit delirium. Journal of Neuroscience Nursing. 2012;44(6):307-16. doi:10.1097/jnn.0b013e3182682f7f.
- Jung P, Puts M, Frankel N, Syed AT, Alam Z, Yeung L, et al. Delirium incidence, risk factors, and treatments in older adults receiving chemotherapy: A systematic review and meta-analysis. Journal of Geriatric Oncology. 2021;12(3):352-60. https://doi.org/10.1016/j.jgo.2020.08.011
- Lee A, Mu J, Joynt G, Chiu C, Lai V, Gin T, et al. Risk prediction models for delirium in the intensive care unit after cardiac surgery: a systematic review and independent external validation. BJA: British Journal of Anaesthesia. 2017;118(3):391-9.
- Shao S-C, Lai C-C, Chen Y-H, Chen Y-C, Hung M-J, Liao S-C. Prevalence, incidence and mortality of delirium in patients with COVID-19: a systematic review and meta-analysis. Age and ageing. 2021;50(5):1445-53. https://doi. org/10.1093/ageing/afab103.
- Kang J, Lee M, Ko H, Kim S, Yun S, Jeong Y, et al. Effect of nonpharmacological interventions for the prevention of delirium in the intensive care unit: a systematic review and meta-analysis. Journal of critical care. 2018;48:372-84. https://doi.org/10.1016/j. jcrc.2018.09.032.
- Tilouche N, Hassen MF, Ali HBS, Jaoued O, Gharbi R, El Atrous SS. Delirium in the intensive care unit: incidence, risk factors, and impact on outcome. Indian journal of critical care medicine: peer-reviewed, official publication of Indian Society of Critical Care Medicine. 2018;22(3):144.
- Wilson JE, Mart MF, Cunningham C, Shehabi Y, Girard TD, MacLullich AM, et al. Delirium. Nature Reviews Disease Primers. 2020;6(1):1-26. https://doi. org/10.1038/s41572-020-00223-4.
- Detroyer E, Dobbels F, Debonnaire D, Irving K, Teodorczuk A, Fick DM, et al. The effect of an interactive delirium e-learning tool on healthcare workers' delirium recognition, knowledge and strain in caring for delirious patients: a pilot pre-test/post-test study. BMC medical education. 2016;16(1):1-10. https://doi.org/10.1186/s12909-016-0537-0.

- Tan H, Zhou L, Wu S, Dong Q, Yang L, Xu J, et al. Subjective strain of care experienced by pulmonary and critical care medical nurses when caring for patients with delirium: a cross-sectional study. BMC Health Services Research. 2021;21(1):1-7. https://doi.org/10.1186/ s12913-021-06860-z.
- Sanson G, Khlopenyuk Y, Milocco S, Sartori M, Dreas L, Fabiani A. Delirium after cardiac surgery. Incidence, phenotypes, predisposing and precipitating risk factors, and effects. Heart & Lung. 2018;47(4):408-17. https:// doi.org/10.1016/j.hrtlng.2018.04.005.
- Işıl Ö, Yaşlı ON. demanslı bireye bakım verenlerde bakım yükü ve yaklaşımlar. T3 rkiye Klinikleri Dergisi. 2016;2(1):74-80.
- Liu Z, Heffernan C, Tan J. Caregiver burden: A concept analysis. International journal of nursing sciences. 2020;7(4):438-45. https://doi. org/10.1016/j.ijnss.2020.07.012.
- Schmitt EM, Gallagher J, Albuquerque A, Tabloski P, Lee HJ, Gleason L, et al. Perspectives on the delirium experience and its burden: common themes among older patients, their family caregivers, and nurses. The Gerontologist. 2019;59(2):327-37.
- Karasar N. Bilimsel Araştırma Yöntemi, Nobel Yayınevi 14. Baskı, Ankara. 2005:81-3.
- Şencan H. Sosyal ve Davranışsal Ölçümlerde Güvenirlik ve Geçerlilik. 1. ed. Ankara: Seçkin Yayınevi 2005.
- Tavşancıl E. Ölçme ile ilgili temel kavramlar. Tutumların ölçülmesi ve SPSS ile veri analizi. 3. ed: Nobel Yayın Dağıtım; 2006.
- Milisen K, Cremers S, Foreman MD, Vandevelde E, Haspeslagh M, De Geest S, et al. The strain of care for Delirium Index: a new instrument to assess nurses' strain in caring for patients with delirium. International Journal of Nursing Studies. 2004;41(7):775-83. https://doi. org/10.1016/j.ijnurstu.2004.03.005.
- Polit DF, Beck CT. The content validity index: are you sure you know what's being reported? Critique and recommendations. Research in nursing & health. 2006;29(5):489-97.
- Gürbüz S, Şahin F. Sosyal Bilimlerde Araştırma Yöntemleri Felsefe-Yöntem-Analiz. 4. ed: Seçkin Yayınevi.; 2017.
- Kalaycı S. SPSS uygulamalı çok değişkenli istatistik teknikleri. 5. ed: Asil Yayın Dağıtım Ltd. Şti.; 2010.
- Tavşancıl E. Tutumların ölçülmesi ve SPSS ile veri analizi. Ankara: Nobel Yayın Dağıtım; 2010.

- Polit DF, Beck CT. Essentials of nursing research:Appraising evidence for nursing practice. 7 ed. Philadelphia: Wolters Kluwer Health, Lippincott Williams & Wilkins.; 2010.
- 24. Tabachnick BG, Fidell LS. Using Multivariate Statistics. Rotation. Oblique Rotation. . 6. ed. USA: Pearson Education Limited; 2014. 491,2,501. p.
- Çapık C, Gözüm S, Aksayan S. Kültürlerarası ölçek uyarlama aşamaları, dil ve kültür uyarlaması: Güncellenmiş rehber. Florence Nightingale Journal of Nursing. 2018;26(3):199-210. https://doi. org/10.26650/FNJN397481.
- 26. Yurdugül H. Ölçek geliştirme çalışmalarında kapsam geçerlik indeksinin kullanımı. 2012.
- Yusoff MSB. ABC of content validation and content validity index calculation. Resource. 2019;11(2):49-54. https://doi. org/10.21315/eimj2019.11.2.6
- Doğan İ, Doğan N. Ölçek Geliştirme Çalışmalarında Kullanılan İçerik Geçerliliğine Genel Bir Bakış. Turkiye Klinikleri Journal of Biostatistics. 2019;11(2). doi: 10.5336/ biyostatik.2019-65953.
- 29. Uyumaz G, Dirlik EM, Çokluk Ö. AÇIMLAYICI FAKTÖR ANALİZİNDE TEKRAR EDİLEBİLİRLİK: KAVRAM VE UYGULAMA. Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi. 2016;16(2):659-75.
- Aytaç M, Öngen B. Doğrulayıcı faktör analizi ile yeni çevresel paradigma ölçeğinin yapı geçerliliğinin incelenmesi. İstatistikçiler Dergisi: İstatistik ve Aktüerya. 2012;5(1):14-22.
- ÇAPIK C. Geçerlik ve güvenirlik çalişmalarında doğrulayici faktör analizinin kullanimi. Anadolu Hemşirelik ve Sağlık Bilimleri Dergisi. 2014;17(3):196-205.
- Evci N, Aylar F. Derleme: Ölçek geliştirme çalışmalarında doğrulayıcı faktör analizinin kullanımı. Sosyal Bilimler Dergisi. 2017;4(10):389-412.
- Hooper D, Coughlan J, Mullen MR. Structural equation modelling: Guidelines for determining model fit. Electronic journal of business research methods. 2008;6(1):pp53-60-pp53-60.
- Erkorkmaz Ü, Etikan İ, Demir O, Özdamar K, Sanisoğlu SY. Doğrulayıcı faktör analizi ve uyum indeksleri. Turkiye Klinikleri Journal of Medical Sciences. 2013;33(1):210-23.
- Schubert A-L, Hagemann D, Voss A, Bergmann K. Evaluating the model fit of diffusion models with the root mean square error of approximation. Journal of Mathematical Psychology. 2017;77:29-

45. http://dx.doi.org/10.1016/j. jmp.2016.08.004

 Wang K, Xu Y, Wang C, Tan M, Chen P. A corrected goodness-of-fit index (CGFI) for model evaluation in structural equation modeling. Structural Equation Modeling: A Multidisciplinary Journal. 2020;27(5):735-49. https:// www.tandfonline.com/doi/full/10 .1080/10705511.2019.1695213 (accessed:13.09.2022).

- Gözüm S, Aksayan S. Kültürlerarası Ölçek Uyarlaması için Rehber II: Psikometrik Özellikler ve Kültürlerarası Karşılaştırma. Hemşirelikte Araştırma Geliştirme Dergisi 2003(5(1)):3-14.
- Shou Y, Sellbom M, Chen H-F. Fundamentals of Measurement in Clinical Psychology. Journal: https:// doi.org/10.1016/B978-0-12-818697-8.00110-2.