What Do Nurses Experience in Pandemics? A Scale Development Study

Hilal KUŞÇU KARATEPE[*], Tuğba ÖZTÜRK YILDIRIM[**], Hanife TİRYAKİ ŞEN[***]

Abstract

Aim: To develop a valid and reliable measurement tool to identify the challenges nurses face during pandemics.

Method: The study has a cross-sectional and methodological design. Using a multi-method approach, it was conducted with 405 nurses in Istanbul between May 15 and August 15, 2020. Data were collected online via the Personal Information Form and Draft Scale. Descriptive statistics, validity reliability analysis, and total score averages were evaluated for data analysis using SPSS 21 and AMOS 22 programs.

Results: 38 items were grouped into four dimensions. The variance rate was found as 66.88%. Goodness-of-fit statistics were appropriate. The total correlation scores of the items were between 0.42-0.82 ($p<0.001$). Cronbach's alpha value was 0.92. There was no significant difference between the test-retest mean scores (t:1.349, p:0.188), while a highly significant correlation was found between the measurements (r:0.88 $p<0.001$). The overall mean score of the scale was 3.50±0.62.

Conclusions: The valid and reliable scale can assist nurses, managers of healthcare institutions, and policymakers in developing coping strategies for the challenges.

Keywords: Challenges, nurses, nursing, pandemic, scale, validity and reliability.

Özgün Araştırma Makalesi (Original Research Article)
Geliş / Received: 17.01.2022 & **Kabul / Accepted:** 09.08.2022
DOI: https://doi.org/10.38079/igusabder.1056082
[*] RN, PhD, Osmaniye Korkut Ata University, Faculty of Health Sciences, Nursing Department, Osmaniye, Türkiye.
E-mail: hkuscukaratepe@osmaniye.edu.tr ORCID https://orcid.org/0000-0001-9237-2714
[**] RN, PhD, Doğuş University, School of Health Sciences, Nursing Department, Istanbul, Türkiye,
E-mail: tugba.ozturkyildirim@gmail.com ORCID https://orcid.org/0000-0002-6853-8996
[***] RN, PhD, Istanbul Health Directorate, Istanbul, Türkiye. E-mail: hanifetiryaki@gmail.com
ORCID https://orcid.org/0000-0003-3350-1701

ETHICAL STATEMENT: Ethical approval was obtained from the Research Ethics Committee of Osmaniye Korkut Ata University in Türkiye (date: 30/04/2020, E.380). The study procedure was consistent with the Declaration of Helsinki.

Hemşireler Pandemilerde Neler Yaşıyor? Bir Ölçek Geliştirme Çalışması

Öz

Amaç: Hemşirelerin pandemi sürecinde karşılaştıkları güçlükleri belirlemek için geçerli ve güvenilir bir ölçüm aracı geliştirmektir.

Yöntem: Çalışma kesitsel ve metodolojik bir tasarımdadır. Karma yöntem kullanılarak 15 Mayıs-15 Ağustos 2020 tarihleri arasında İstanbul'da 405 hemşire ile gerçekleştirilmiştir. Veriler, Kişisel Bilgi Formu ve Taslak Ölçek ile çevrimiçi olarak toplanmıştır. Tanımlayıcı istatistikler, geçerlik güvenirlik analizi ve toplam puan ortalamaları SPSS 21 ve AMOS 22 programları kullanılarak değerlendirilmiştir.

Bulgular: 38 madde dört boyutta gruplandırılmıştır. Varyans oranı %66,88 idi. Uyum istatistikleri uygundu. Madde toplam korelasyon puanları 0.42-0.82 arasındaydı ($p<0.001$). Cronbach'ın alfa değeri 0.92 idi. Ölçümler arasında oldukça anlamlı bir korelasyon bulunurken ($r:0.88$ $p<0.001$), test-tekrar test ortalama puanları arasında anlamlı fark yoktu ($t:1.349$, $p:0.188$). Ölçeğin genel ortalama puanı 3.50±0.62 idi.

Sonuç: Geçerli ve güvenilir olan ölçek, hemşirelere, sağlık kurumları yöneticilerine ve politika yapıcılara güçlüklerle başa çıkma stratejileri geliştirmede yardımcı olabilir.

Anahtar Sözcükler: Güçlükler, hemşireler, hemşirelik, pandemi, ölçek, geçerlik ve güvenirlik.

Introduction

The COVID-19 pandemic is an unusual and undesirable situation. The things experienced during the fight against the COVID-19 pandemic have once again revealed that nurses are an indispensable element of the healthcare system and that a strong healthcare system is possible with an efficient nursing system[1–3]. Moreover, the pandemic affected the service processes of health institutions, causing many challenges for nurses, who constitute the majority of healthcare professionals and are at the forefront of patient care[4,5]. Healthcare institutions encountered losing their qualified nurses that they could not protect or retain, losing their competitive advantage, downsizing, or disappearing.

The process must be well managed to prevent the negative effects of the pandemic. First of all, analysis is required to identify the problem, which is important for developing a solution. A measurement tool with scientific validity and reliability is needed for this purpose. On the other hand, the difficulties experienced by nurses during the pandemic, especially from the psychological point of view, exist in the literature to a great extent. To the best of our knowledge, these studies were mostly correlational using reviews or current scales. Although these studies made important contributions to the literature, they could not comprehensively evaluate the

challenges faced by nurses during the pandemic. In this study, the challenges faced by nurses were presented comprehensively. For the preparation of the scale items, expert opinion was taken from a large number of literature on various variables, which were collected on a single scale. Thus, it was predicted that researchers could reveal the challenges faced by nurses during pandemics using the scale, and managers could use this data to improve the process.

Background

The cases of pneumonia, which were first seen in Wuhan, China, and reported to the World Health Organization (WHO) on December 31, 2019, were identified as COVID-19 on February 11, 2020. The spread of the infectious disease was announced to be a pandemic on March 11, 2020 because of a rapid increase in the number of cases[6–8]. Nursing care has become more important with the rapid and deadly increase in the number of cases.

Nursing is considered to be the primary occupation in the prevention, treatment, and rehabilitation process of any disease, including COVID-19. This applies to all countries regardless of their socio-economic development[9]. American Nurses Association (ANA, 2018) policy summary states that nurse leaders have a key role in preventing common diseases because nurses have the ability and education to accurately identify infectious diseases[10,11]. They are pioneers in the development of best practices related to patient management and clinical safety. Their responsibilities and activities witness expansion during pandemics such as COVID-19, crises, wars, and disasters. The role of nurses in a pandemic begins before the disease could cause widespread destruction. Nurses collected evidence concerning human needs and catered to them during the COVID-19 crisis. Thus, they ensure patient safety [9].

Nurses faced numerous challenges while caring for their patients during the COVID-19 pandemic. In the studies conducted, it was reported that healthcare professionals experience a high level of uncertainty, unwillingness, depression, insomnia, stress, fear, anxiety, and some thought about leaving work. It was also noted that there may be long-term psychological effects of this condition[12,13]. In the process of providing treatment and care to their patients, health professionals have serious concerns about their mental health, psychological adaptation, and recovery. The fact that COVID-19 is transmitted from humans to humans, has high morbidity and has potentially fatal characteristics, increased the risk of nurses being exposed to the virus [4]. Nurses were observed to have high fear and anxiety about getting infected and infecting others with COVID-19 [14]. Furthermore, it was stated that they are more likely to feel marked and rejected in their neighbourhoods due to their work at the hospital [15]. On the other hand, inadequate resources due to the rapid increase in the number of patients affected by the COVID-19 virus caused difficulties in achieving the goal of providing the best care for all patients. It was reported that this situation

increased the concerns of healthcare workers [4]. In addition, it was stated that it caused some healthcare workers to experience feelings of guilt and forced hospital management and health workers to make ethically difficult decisions [16]. They had to manage many critical decision-making processes quickly from conducting effective testing and isolation of patients with suspected infection to deciding whether patient care units should be closed because of a positive test result of a patient or staff [14].

Another challenge that was experienced by nurses during the pandemic emerged due to their working conditions. Some of these challenges were reported as increased workload, long working hours, physical exhaustion, inadequacy, and difficulty in the use of personal protective equipment (PPE), and allergies that develop due to the use of PPE [12,17,18]. During the period when the number of infected and dead patients because of COVID-19 increased, many of the nurses could not be sent home due to the lack of staff [19].

In conclusion, it is important to know the challenges faced by nurses to ensure the sustainability of quality and qualified patient care outcomes during the ongoing pandemic. This study was conducted to develop a valid and reliable measurement tool to determine the challenges faced by nurses during pandemics.

The study tested the following hypothesis.

*Hypothesis: Scale for Challenges Faced by Nurses in Pandemics is a valid and reliable measurement tool.

Material and Methods

Study Design

This study had a cross-sectional and methodological design. The multi-method approach was used in two phases, where the first phase was the validity (the surface and content validity, the structural validity) and the second phase was the reliability. The study was conducted and reported according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guideline [20].

Participants

The universe of this research consists of working nurses who work in the state, university, and private hospitals in Istanbul since approximately one-fifth of the population in Turkey lives in Istanbul, and it is the city with the highest number of COVID-19 from May 15 to August 15, 2020. In the study, separate sample selection was made for the surface and content validity (n=18), pilot implementation (n=30), and test-retest analyses (n=30). These samples, similar to the universe,

were not included in the population. Explanatory factor analysis was performed on one part of the main sample (n=210) and a confirmatory factor analysis was performed on the other part (n=195).

For the surface and content validity of the study, a two-round e-Delphi technique was applied to create draft scale items. Panel experts were selected with the purposive sampling method in Delphi. The purposive sampling method, often used as a sampling approach in Delphi surveys[21,22], was used in the recruitment of the panel experts. Although there is no consensus on the number of experts, it is indicated that it may vary depending on the subject of study [22]. In this study, 18 experts were selected from 3 different types of institutions (private, university, and public hospitals), 6 people represented each type of institution—2 people from the emergency service, 2 people from the intensive care unit, and 2 people from the pandemic service—units that are frequently contacted with COVID-19 patients. The selection criteria determined for nurse experts were the following: (1) to have a bachelor's degree in nursing; (2) to be working in an emergency or intensive care service for at least 3 years; and (3) to be working in a service for at least 5 years. The experts were informed about the study. The first round of Delphi started with 18 experts who agreed to participate in the study. The second Delphi was completed with 18 experts.

Based on the selection criteria for the structural validity and reliability of the draft scale, a random sampling was created with nurses who (1) were working in a public, private, or state hospital in Istanbul, (2) in contact with the researchers, (3) volunteered to attend the study (4) in about 10 times the number of items generated by Delphi (n=405). In scale development studies, the number of participants must be a minimum of five times and a maximum of ten times each item of the draft scale[23]. Explanatory factor analysis was performed with a sample (n=210) of at least five times the draft scale form (42 items). The confirmatory factor analysis was conducted with a sample of at least five times the remaining 38 items after the explanatory factor analysis (n=195). There wasn't any missing data.

Data Collection

Data was collected online via the Personal Information Form and Draft Scale (42 items).

Personal Information Form

Demographic characteristics such as gender, educational background, type of institution, position, age, and total professional experience (six questions) of panel experts in Delphi rounds for surface and content reliability were assessed. Nurses' gender, marital status, educational background, type of institution, age, total professional experience, and weekly working hours (seven questions) were assessed for structural validity and reliability analysis.

Draft Scale Form

It was a 42-item scale to determine the difficulties nurses experienced during the pandemic. For the surface and content validity of the study, a two-round e-Delphi technique was applied to create draft scale items. The Delphi technique is a technique that systematically combines expert views and provides consensus on specific issues[22]. It is recommended to repeat the survey, at least two times or more, until consensus is established. Responses from each round are analysed, summarized, and presented to the same experts[24].

In the two Delphi rounds, a different e-Delphi survey was used for each round. In the first round, the research team aimed to get expert opinions and to develop structured questions about the challenges faced during pandemic conditions. The open-ended questionnaire, gathering different views and collecting information on the subject [22], was prepared using Google Forms and included demographic characteristics of experts. The open-ended question was: "Describe in detail the challenges you faced in the COVID-19 pandemic conditions." The online survey was sent via e-mail or WhatsApp application, and a reminder was sent to those who did not respond within 10 days. Eighteen panellists who agreed to participate in the study were called and informed about what was expected of them. In this first round, which lasted 15 days, expert opinions were obtained. The data collected from the experts in the first round was evaluated by content analysis, and 47 items were created by the research team to be presented to the experts in the second round of Delphi (Table 1). The second round aimed to present the experts with 47 items created in the first round to assess their possibility of being a scale item and to get their recommendations. In the second e-Delphi questionnaire, a Likert scale was used for these statements (1: definitely should not be included; 2: should not be included: 3: undecided; 4: should be included; 5: should definitely be included). The second e-Delphi questionnaire was sent to the 18-panel experts via email and WhatsApp application. Furthermore, experts were called and informed about the round. The second round took 10 days, where all experts participated.

Table 1. Draft scale items in Delphi rounds (n:18)

Challenges faced by nurses in pandemics		**Percentage of Consensus ≥ 80%**	**Mean**	**Standard Deviation ≤ 1**	**Median ≥ 4**	**Interquartile Range (IQR) ≤1**	**Result**
1	I think that the necessary equipment for patient care (respirator, patient bed, etc.) is insufficient.	88.9	4.56	0.70	5.00	1	Retain
2	I feel worthless in people's eyes in the pandemic.	83.3	4.28	0.89	4.50	1	Retain

3	I have physical difficulty using my personal protective equipment in pandemic conditions.	94.4	4.72	0.57	5.00	0	Retain
4	I think that working hours are not planned effectively.	88.9	4.50	0.86	5.00	1	Retain
5	I can't eat healthy.	88.9	4.44	0.86	5.00	1	Retain
6	I have skin problems (such as allergies)	88.9	4.17	0.79	4.00	1	Retain
7	I'm afraid of transmitting the disease to my family/people around me.	88.9	4.72	0.83	5.00	0	Retain
8	I can't rest in pandemic conditions.	88.9	4.39	0.70	4.50	1	Retain
9	I'm having trouble meeting my basic needs.	88.9	4.50	0.71	5.00	1	Retain
10	*I think that management does not plan nursing manpower properly.	**77.8**	**4.33**	**1.08**	**5.00**	**1**	**Drop**
11	I think that supportive training courses (coping with stress, communication management, etc.) are insufficient.	83.3	4.44	0.92	5.00	1	Retain
12	I'm afraid of dying.	88.9	4.56	0.70	5.00	1	Retain
13	I'm afraid of losing one of my family or the people I love because of the pandemic.	88.9	4.78	0.65	5.00	0	Retain
14	I think that administrative support is insufficient.	83.3	4.39	0.92	5.00	1	Retain
15	I feel sad because I have to live apart from my family/loved ones.	88.9	4.67	0.69	5.00	0	Retain
16	Uncertainty about the future worries me.	88.9	4.61	0.70	5.00	1	Retain
17	I want to quit my job.	88.9	3.94	0.42	4.00	0	Retain
18	My hygiene habits have turned into obsessions.	88.9	4.50	0.71	5.00	1	Retain
19	I have to stay apart from my loved ones.	88.9	4.61	0.85	5.00	0	Retain
20	I have to live with my family because I don't have sufficient resources.	83.3	4.44	0.92	5.00	1	Retain
21	*I think that the institution has no plan for disastrous/crisis conditions.	**77.8**	**4.28**	**1.07**	**5.00**	**1**	**Drop**
22	I need psychological support.	88.9	4.67	0.69	5.00	0	Retain
23	I feel exhausted.	88.9	4.56	0.70	5.00	1	Retain
24	I think personal protective equipment is insufficient.	83.3	4.44	0.92	5.00	1	Retain
25	I think my family's integrity has been negatively affected by pandemic conditions.	88.9	4.61	0.85	5.00	0	Retain
26	I feel socially excluded.	88.9	4.39	0.70	4.50	1	Retain
27	I'm physically struggling due to increased working hours.	88.9	4.56	0.70	5.00	1	Retain
28	I'm having trouble taking care of my children.	88.9	4.44	0.86	5.00	1	Retain
29	I'm having transportation problems.	88.9	4.44	0.70	5.00	1	Retain

30	I feel my efforts are not appreciated by society.	88.9	4.33	0.69	4.00	1	Retain
31	I'm having a confusion of role	88.9	4.39	0.70	4.50	1	Retain
32	I'm having difficulty in time management.	88.9	4.44	0.70	5.00	1	Retain
33	I'm having musculoskeletal problems.	88.9	4.44	0.86	5.00	1	Retain
34	I'm afraid of getting infected.	88.9	4.78	0.65	5.00	0	Retain
35	I think that basic education courses (knowledge about the causes of the disease, protection/isolation measures, etc.) are insufficient.	88.9	4.50	0.71	5.00	1	Retain
36	I can't enjoy life.	83.3	4.39	0.92	5.00	1	Retain
37	*I think that the number of qualified personnel is insufficient in the pandemic process.	**74.8**	**4.26**	**1.05**	**5.00**	**1**	**Drop**
38	*I think my social life is restricted.	**73.8**	**4.28**	**1.09**	**5.00**	**1**	**Drop**
39	I think that working conditions have been aggravated in the pandemic	94.4	4.56	0.62	5.00	1	Retain
40	I think that my workload has increased.	88.9	4.61	0.85	5.00	0	Retain
41	I feel more tired.	83.3	4.22	1.00	4.50	1	Retain
42	I'm experiencing increased stress.	88.9	4.72	0.67	5.00	0	Retain
43	I think that work lists are not made fairly.	88.9	4.44	0.86	5.00	1	Retain
44	I'm having pressure issues due to wearing protective equipment.	88.9	4.33	0.84	4.50	1	Retain
45	*I think that I'm not rewarded for the performance I've shown.	**72.7**	**4.28**	**1.07**	**5.00**	**1**	**Drop**
46	I think that the flow of information is not transparent.	88.9	4.56	0.70	5.00	1	Retain
47	I'm having trouble sleeping.	88.9	4.50	0.71	5.00	1	Retain
*** Item that did not meet the consensus criteria and was excluded from the study.**							

Since it was aimed to provide a strong consensus between the experts in this study, standard deviation and interquartile range width were determined to be 1 and below, and the percentage of consensus (the total ratio of "should definitely be included"-5 and "should be included"-4 items) was determined to be 80% as a measure of reconciliation. In Delphi studies, the percentage of consensus ranges between 55% and 100%[25], and the consensus is indicated when the difference between the first and third quarters is less than or equal to 1.5 and when the median is equal to or higher than 4[26].

A pilot implementation was conducted with 30 nurses to test the clarity of the items in the draft scale [27]. The items were also reviewed by competent language experts in the field.

Data Analysis

Descriptive statistics (number, percentage, mean, standard deviation) and psychometric tests (Consensus criteria, Kaiser–Meyer–Olkin (KMO), the measure of adequacy, and Bartlett's Test of Sphericity, exploratory factor analysis (EFA), and confirmatory factor analysis (CFA), item-total correlation (Pearson product-moment correlation), internal consistency coefficients (Cronbach's alpha, Spearman-Brown, and Guttman) and time invariance (Test-Retest Analysis: Pearson Correlation, t-Test) were evaluated for the data analysis (Table 2) using SPSS 21 and AMOS 22 programs (Sakib et al., 2020).

Table 2. Analysis used in the scale validity reliability

Validity	**Validity and reliability criteria**	**Method**
	Surface and content validity	Delphi with Two Rounds **Consensus Criteria* *(Standard deviation, quartile width is 1 and below, percentage of consensus is 80% and above, and median is equal to or higher than 4)* Pilot Implementation
	Structural validity	Factor Analysis **Explanatory Factor Analysis* **Confirmatory Factor Analysis*
Reliability	Item Analysis	Item Total Score Correlation
	Internal Consistency	Cronbach's Alpha Reliability Coefficient Spearman-Brown Internal Consistency Coefficients Guttman Internal Consistency Coefficients
	Time Invariance	Test-Retest Analysis **Pearson Correlation* ** t-Test*

Ethical Considerations

Research, entrepreneurship, and work outside the international code of ethics for Turkey were carried out following legal requirements. Ethical approval was obtained from the research ethics committee of Osmaniye Korkut Ata University in Turkey (date: 30/04/2020, E.380). The study procedure was consistent with the Declaration of Helsinki (World Medical Association [WMA],

2013). The nurses who participated in the study were informed about the purpose and methodology of the study, and their consent was obtained.

Results

Findings Regarding the Participants

Regarding the demographic characteristics of panel experts (n=18) for surface and content validity (Delphi rounds), 83.3% were female, 66.7% had a Bachelor's degree, 55.6% were between 31–37 years of age, and 38.9% had professional experience of 10 years or above. Regarding the demographic characteristics of nurses (n=405) for structural validity and reliability analysis, 73.3% were female, 69.8% were married, 65.9% had a Bachelor's degree, 51.6% worked in a state hospital, 37.5% were between 31–37 years of age, 34.5% had professional experience of 8–11 years, and 58.7% had 45–50 weekly working hours.

Validity Results

Surface and Content Validity

47 scale items were created considering the results obtained from the first round of Delphi. At the end of the second round of Delphi, the experts identified the challenges faced by nurses in Turkey into 42 items. It was found that the percentage of consensus for five items was between 72.7% and 78.8% and that the standard deviation and interquartile range were greater than 1, so these items were removed from the scale (Table 1). According to the pilot implementation, it wasn't necessary to change the expressions in the draft scale items. The items were also reviewed by competent language experts in the field.

Structural Validity

For the normality, items were valued between | −1.5 | and | +1.5 | in Skewness and Kurtosis values. KMO was 0.87 and Bartlett's Test of Sphericity was significant (5745.862/861). The data set was found to be eligible for factor analysis ($p<0.001$)[28].

For EFA (n:210), the lower cut-off point was taken as 0.50[29]. As the 4-item factor load value was below 0.50, it was eliminated from the scale. The eigenvalue coefficient was taken as "1" in sizing the draft items, and they were divided into "4" dimensions. The factor loads of the draft scale ranged between 0.51–0.76 for dimension 1, 0.54–0.86 for dimension 2, 0.53–0.87 for dimension 3, and 0.62–0.78 for dimension 4 (Table 3). The total variance was found to be 66.88%. After Varimax factor rotation, dimension 1 consisted of the following 8 items, dimension 2; 12 items; dimension 3; 8 items and dimension 4; 10 items. They were named by the literature as 1. Physical

Challenges Dimension (PCD), 2. Mental Challenges Dimension (MCD), 3. Social Challenges Dimension (SCD) and 4. Institutional and Managerial Challenges Dimension (IMCD).

Table 3. EFA analysis factor loads (n: 210) in the draft scale

		Mean	SD	Skew	Wolf	PCD	MCD	SCD	IMCD
Physical Challenges Dimension									
1	I'm physically struggling due to increased working hours.	3.74	1.24	-0.81	-.40	**0.74**	–.264	.181	.410
2	I feel more tired.	4.04	1.18	-1.36	.97	**0.76**	-.157	.196	.442
3	I find it difficult to use my personal protective equipment.	3.77	1.24	-0.80	-.45	**0.53**	–.233	-.031	.247
4	I'm having musculoskeletal problems.	3.61	1.25	-0.71	-.48	**0.74**	–.173	.230	.385
5	I can't eat healthy.	3.45	1.25	-0.47	-.80	**0.59**	–233	.083	.338
6	I have skin problems (such as allergies).	3.49	1.39	-0.47	-1.09	**0.64**	–.205	.116	.382
7	I'm having pressure issues due to wearing protective equipment.	3.05	1.37	0.05	-1.27	**0.51**	–.237	.142	.248
8	*I can't rest in pandemic conditions.	3.49	1.27	-0.41	-.93	**0.35**	–.302	.229	.331
9	I'm having trouble sleeping.	3.69	1.30	-0.70	-.66	**0.66**	–.141	.167	.345
Mental Challenges Dimension									
10	I'm afraid of getting infected.	4.16	1.05	-1.36	1.19	.130	**0.66**	-.312	.066
11	I'm afraid of transmitting the disease to my family/people around me.	4.51	0.85	-1.28	1.34	.299	**0.85**	-.327	.058
12	I'm afraid of dying.	3.53	1.29	-0.50	-0.92	.034	**0.54**	-.164	-.014
13	*I'm afraid of losing one of my family or the people I love because of the pandemic.	4.38	1.01	-1.10	1.20	.237	**0.38**	-.298	-.045
14	I can't enjoy life.	4.16	1.06	-1.30	1.03	.213	**0.67**	-.244	-.023
15	I feel sad because I have to live apart from my family/loved ones.	4.12	1.21	-1.40	0.89	.240	**0.74**	-.275	-.062
16	Uncertainty about the future worries me.	4.34	0.97	-1.32	1.41	.309	**0.82**	-.413	-.019
17	I'm experiencing increased stress.	4.25	1.02	-1.15	1.26	.142	**0.77**	-.245	-.148
18	My hygiene habits have turned into obsessions.	3.85	1.15	-0.86	-0.18	.207	**0.57**	-.194	-.023
19	*I feel worthless in people's eyes in the pandemic.	3.30	1.22	-0.42	-0.58	.444	**0.36**	-.052	-.001
20	I have to live with my family because I don't have sufficient resources.	3.67	1.33	-0.69	-0.73	-.074	**0.86**	-.044	-.129
21	I feel my efforts are not appreciated by society.	2.97	1.34	-0.03	-1.17	.272	**0.71**	.000	.014
22	I need psychological support.	3.45	1.22	-0.34	-0.90	.035	**0.62**	-.018	-.049
23	I feel exhausted.	3.77	1.26	-0.79	-0.51	-.020	**0.57**	-.037	.010

Social Challenges Dimension									
24	I think my family's integrity is been negatively affected.	3.47	1.19	-0.27	-1.07	-.072	.093	**0.53**	-.156
25	I have to stay apart from my loved ones.	3.93	1.09	-0.96	0.25	.170	-.012	**0.74**	-.151
26	I feel socially excluded.	3.16	1.18	0.09	-0.94	-.085	.166	**0.56**	-.218
27	I'm having trouble taking care of my children.	2.99	1.38	-0.07	-1.28	-.060	.217	**0.62**	-.206
28	I'm having transportation problems.	3.33	1.28	-0.33	-1.07	-.065	.247	**0.68**	-.324
29	I'm having trouble meeting my basic needs.	3.22	1.24	-0.08	-1.13	-.195	.286	**0.72**	-.395
30	I'm having a confusion of role.	3.32	1.27	-0.23	-1.08	-.238	.361	**0.87**	-.447
31	I'm having difficulty in time management.	3.50	1.23	-0.43	-0.93	-.220	.331	**0.75**	-.279
Institutional and Managerial Challenges Dimension									
32	I think personal protective equipment is insufficient.	3.08	1.31	-0.17	-1.07	-.111	.268	.136	**0.62**
33	I think that the necessary equipment for patient care (respirator, patient bed, etc.) is insufficient.	3.46	1.24	-0.61	-0.57	.022	.334	.083	**0.65**
34	I think that basic education courses (knowledge about the causes of the disease, protection/isolation measures, etc.) are insufficient.	3.43	1.28	-0.60	-0.69	.072	.400	.045	**0.69**
35	I think that supportive training courses (coping with stress, communication management, etc.) are insufficient.	3.20	1.33	-0.30	-1.10	.120	.423	-.010	**0.72**
36	*I think that working conditions have been aggravated in the pandemic.	4.00	1.13	-1.19	0.77	.572	.251	.031	**0.32**
37	I think that my workload has increased.	4.03	1.10	-1.18	0.72	.608	.216	-.051	**0.76**
38	I think that administrative support is insufficient.	3.10	1.28	-0.32	-0.94	.009	.401	.087	**0.69**
39	I think that work lists are not made fairly.	3.20	1.27	-0.29	-0.90	-.040	.327	.112	**0.67**
40	I think that working hours are not planned effectively.	3.08	1.25	-0.14	−0.19	-.092	.278	.057	**0.63**
41	I think that the flow of information is not transparent.	3.20	1.26	-0.30	−0.21	.043	.374	.037	**0.75**
42	I want to quit my job.	2.22	1.28	0.72	−0.65	.183	.005	-.098	**0.78**
*** Item excluded from the analysis as its factor load is below 0.50**									

The accuracy of the "4" dimensional structure was confirmed by CFA (n=195). Acceptable cut-off values were taken into account for each index (Sakib et al., 2020). Parameters were calculated as CMIN = 320.162, DF = 172, (p:0.000), $\chi 2/df = 1.86$, RMSEA = 0.05, RMR = 0.07, IFI = 0.95, CFI = 0.95, GFI = 0.94, AGFI = 0.91, NFI = 0.93.

Reliability

The total correlation scores of the items were between 0.42 and 0.82 ($p<0.001$). For the overall scale, Cronbach's alpha coefficient was 0.92; the Spearman-Brown coefficient was 0.84; the Guttman coefficient was 0.95. They were calculated as 0.88, 0.87, 0.90 for PCD; 0.87, 0.86, 0.90 for MCD; 0.86, 0.76, 0.87 for SCD, 0.80, 0.82, 0.88 for IMCD, respectively. It was determined that there was no significant difference between the mean scores obtained from the first and second test-retest analysis (t:1.349, p:0.188) and there was a highly significant relationship between the measurements (r:0.88, $p<0.001$).

Scale Scoring

The overall mean score of the scale was 3.50±0.62. The scores for subdimensions were 3.65±0.97 for PCD; 3.89±0.81 for MCD; 3.43±0.93for SCD, and 3.04±0.78 for IMCD. In the evaluation of the mean scores, it was considered that "the range of $1.01<X<1.80$ is too low level, $1.81<X<2.60$ is low level, $2.61<X<3.40$ is medium level, $3.41<X<4.20$ is high level, and $4.21<X<5.00$ is a very high level". The "Scale for Challenges Faced by Nurses in Pandemics (SCFNP)" is a five-point Likert-type with the following options: 1-Strongly disagree, 2-Disagree, 3-Undecided 4-Agree, and 5-Strongly agree. It has 4 subdimensions and 38 items. PCD includes items 1.,2.,3.,4.,5.,6.,7.,9.; MCD 10.,11.,12.,14.,15.,16.,17.,18.,20.,21.,22.,23.; SCD 24.,25.,26.,27.,28.,29.,30.,31.; IMCD 32.,33.,34.,35.,37.,38.,39.,40.,41.,42. All items are scored straight. As the scores received on the scale increase, the level of challenges experienced by the nurses also increases. The total score received from the scale is between 38 and 190. It ranges between 8–40 for PCD; 12–60 for MCD; 8–40 for SCD and 10–50 for IMCD.

Discussion

In this study, a scale was developed to determine the challenges faced by nurses during the pandemic, using a multi-method approach. The draft scale was created with two rounds of Delphi. A strong consensus was achieved with the opinions of 18 experts, in line with the consensus criteria. A 42-item "SCFNP" draft form was sent to nurses, data were collected and analyzed. EFA was applied to the data obtained from a group of nurses (n=210) for the structural validity test of the scale. A four-factor structure was obtained with 38 items. The dimensions were named as Physical (8 items), Mental (12 items), Social (8 items), Institutional and Managerial (10 items) Challenges, taking the existing literature and expression content into account. Then, the four-factor structure of the SCFNP obtained by the EFA result was confirmed by CFA (n=195). The goodness-of-fit statistical values were good. Scale robustness was appropriate. All the results obtained may prove that the scale accurately measures the challenges faced by nurses during the pandemic. In terms of reliability, item correlations were within appropriate limits, and the items

were consistent with the whole scale. Internal consistency was calculated for the whole scale and its sub-dimensions. It was determined that the items had high internal consistency and high reliability with each other. In addition, in the test-retest analysis performed to measure the time invariance, no statistically significant difference was found between the two measurements, and the test-retest reliability coefficient was found to be quite high. These results may prove that the scale measures the challenges faced by nurses during the pandemic in a consistent and stable manner. As a result, the scale is a valid and reliable measurement tool, and the hypothesis was confirmed.

The data to be obtained with this scale can be used to develop strategies to ensure the continuity of nursing care in response to the difficulties brought by the pandemic. Since a similar scale has not been found in the literature, it was predicted that it would fill a large gap in the field of nursing. A comprehensive literature review was conducted in the study, which contributed to the generalizability of the scale. On the other hand, the preparation of the draft scale items by experienced nurses makes a significant contribution to its methodological robustness. In addition, the diversity of the experts consulted provided a comprehensive, clear, concise presentation of the difficulties experienced by nurses. On the other hand, the scale was designed as a whole. However, the internal consistency values of the sub-dimensions of the scale were also quite high, and they can be used separately. Provided that the necessary analyses of the scale are made, its application in different samples (like other healthcare professionals) may strengthen the study findings.

Limitations

This study was conducted online under pandemic conditions. Therefore, nurses without internet access could not be included in the study. On the other hand, participants may be less attentive in an online survey compared to a printed survey. It is possible for careless responses to affect the results. Results are largely based on individual reports of participants. These reports may not reflect the real situation of individuals and may cause bias due to prejudices. In addition, in this process, it was observed that the challenges brought by the pandemic reduced the desire and support of nurses for academic studies. This may be because they do not have time to fill out surveys due to their heavy workload. Finally, the results could not be compared, as no scale similar to that used in the study could be found. Therefore, it may have limitations regarding its sensitivity and specificity.

Conclusion

The COVID-19 pandemic has strongly demonstrated the important role nurses play in the prevention and control of epidemics. Global health threats such as the pandemic require nurses

to manage knowledge, skills, ethical principles, managerial skills, work-home life balance, and stress. In this context, it has become an important issue to reveal the challenges faced by nurses in order to support them. The current literature shows that there is a large gap in this regard. Study results revealed that "SCFNP" is a valid and reliable measurement tool. On this scale, nursing managers, managers of healthcare institutions, and policymakers can provide improvements to cope with the factors that negatively affect nurses during the pandemic process.

REFERENCES

1. Fawaz M, Anshasi H, Samaha A. Nurses at the front line of COVID-19: Roles, responsibilities, risks, and rights. *Am J Trop Med Hyg*. 2020;103(4):1341-1342. doi:10.4269/ajtmh.20-0650.

2. International Council of Nurses. Nurses: A Voice to Lead - Nursing the World to Health. https://2020.icnvoicetolead.com/wp-content/uploads/2020/03/IND_Toolkit_120320.pdf.Published 2020. Accessed 17 July 2021.

3. World Health Organization. State of the world's nursing 2020: Investing in education, jobs and leadership. https://www.who.int/publications/i/item/9789240003279. Published 2020. Accessed 19 September 2021.

4. Lai J, Ma S, Wang Y, et al. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA Netw Open*. 2020;3(3). doi:10.1001/jamanetworkopen.2020.3976.

5. Fernandez R, Lord H, Halcomb E, et al. Implications for COVID-19: A systematic review of nurses' experiences of working in acute care hospital settings during a respiratory pandemic. *Int J Nurs Stud*. 2020;111. doi:10.1016/j.ijnurstu.2020.103637.

6. World Health Organization. *Novel Coronavirus (2019-NCoV) Situation Report-1*.; 2020. https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports Published 2020. Accessed 23 September 2021.

7. World Health Organization. Coronavirus disease 2019 (COVID-19) situation report-51. https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports. Published 2020. Accessed 22 September 2021.

8. Zhu N, Zhang D, Wang W, et al. A Novel Coronavirus from Patients with Pneumonia in

China, 2019. *N Engl J Med*. 2020;382(8):727-733. doi:10.1056/nejmoa2001017.

9. Buheji M, Buhaid N. Nursing Human Factor During COVID-19 Pandemic. *Int J Nurs Sci*. 2020;10(1):12-24. doi:10.5923/j.nursing.20201001.02.

10. Corless IB, Nardi D, Milstead JA, et al. Expanding nursing's role in responding to global pandemics 5/14/2018. *Nurs Outlook*. 2018;66(4):412-415. doi:10.1016/j.outlook.2018.06.003.

11. American Nurses Association. Nurses responding to global pandemics. https://onlinenursing.duq.edu/blog/nurses-responding-to-global-pandemics/. Published 2020. Accessed 4 July 2021.

12. Mo Y, Deng L, Zhang L, et al. Work stress among Chinese nurses to support Wuhan in fighting against COVID-19 epidemic. *J Nurs Manag*. 2020;28(5):1002-1009. doi:10.1111/jonm.13014.

13. Kang L, Li Y, Hu S, et al. A novel coronavirus outbreak of global health concern. *Lancet*. 2020;395(10223):470-473. doi:10.1016/S0140-6736(20)30185-9.

14. Tsamakis K, Rizos E, Manolis A, et al. COVID-19 pandemic and its impact on mental health of healthcare professionals. *Exp Ther Med*. 2020;19(6):3451-3453. doi:10.3892/etm.2020.8646.

15. Bai YM, Lin CC, Lin CY, Chen JY, Chue CM, Chou P. Survey of stress reactions among health care workers involved with the SARS outbreak. *Psychiatr Serv*. 2004;55(9):1055-1057. doi:10.1176/appi.ps.55.9.1055.

16. Greenberg N, Docherty M, Gnanapragasam S, Wessely S. Managing mental health challenges faced by healthcare workers during covid-19 pandemic. *BMJ*. 2020;368. doi:10.1136/bmj.m1211.

17. Liu Z, Han B, Jiang R, et al. Mental health status of doctors and nurses during COVID-19 epidemic in China. SSRN. https://ssrn.com/abstract=3551329 Yayınlanma tarihi 2020.

18. Pappa S, Ntella V, Giannakas T, Giannakoulis VG, Papoutsi E, Katsaounou P. Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis. *Brain Behav Immun*. 2020;88:901-907. doi:10.1016/j.bbi.2020.05.026.

19. Baumgaertner E, Karlamangla S. Doctors and nurses brace for coronavirus onslaught:

'What happens if I end up on a ventilator? Los Angeles Times. https://www.latimes.com/california/story/2020-03-20/coronavirus-doctors-nurses-fears-ventilator-icu-emergency. Published 2020. Accessed May 15, 2021.

20. Von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP. The strengthening the reporting of observational studies in epidemiology (STROBE) statement: Guidelines for reporting observational studies. *Int J Surg*. 2014;12(12):1495-1499. doi:10.1016/j.ijsu.2014.07.013.

21. De Loë RC, Melnychuk N, Murray D, Plummer R. Advancing the state of policy delphi practice: A systematic review evaluating methodological evolution, ınnovation, and opportunities. *Technol Forecast Soc Change*. 2016;104:78-88. doi:10.1016/j.techfore.2015.12.009.

22. Belton I, Macdonald A, Wright G, Hamlin I. Improving the practical application of the Delphi method in group-based judgement: A six-step prescription for a well-founded and defensible process. *Technological Forecasting and Social Change*. 2019; 147:72-82. doi:10.1016/J.TECHFORE.2019.07.002

23. Soron TR. Validation of bangla montgomery asberg depression rating scale (MADRSB). *Asian J Psychiatr*. 2017;28:41-46. doi:10.1016/j.ajp.2017.03.019.

24. Ametepey SO, Aigbavboa CO, Thwala WD. Assessment of the Use of Delphi Technique in Sustainable Infrastructure Development Research. In: Periodica Polytechnica Budapest University of Technology and Economics; 2019:646-655. doi:10.3311/ccc2019-089.

25. Vernon W. The Delphi technique: A review. *Int J Ther Rehabil*. 2009;16(2):69-76. doi:10.12968/ijtr.2009.16.2.38892.

26. Courtenay M, Deslandes R, Harries-Huntley G, Hodson K, Morris G. Classic e-Delphi survey to provide national consensus and establish priorities with regards to the factors that promote the implementation and continued development of non-medical prescribing within health services in Wales. *BMJ Open*. 2018;8(9):e024161. doi:10.1136/bmjopen-2018-024161.

27. Harmancı Seren AK, Ünaldı Baydın N. Validity and reliability study of the compulsory citizenship behaviour scale in Turkish: A study among nurses. *Sağlık ve Hemşirelik Yönetimi Derg*. 2017; 4(2): 43-49. doi:10.5222/shyd.2017.043.

28. Williams B, Onsman A, Brown T. Exploratory factor analysis: A five-step guide for novices. *Aust J Paramed*. 2010;8(3). doi:10.33151/ajp.8.3.93.

29. Hair Jr JF, Hult GTM, Ringle C, Sarstedt M. *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. Second. Sage publications; 2016. https://us.sagepub.com/en-us/nam/a-primer-on-partial-least-squares-structural-equation-modeling-pls-sem/book244583. Accessed January 7, 2021.