RESEARCH ARTICLE

The validity and reliability of the Stress and Anxiety to Viral Epidemics-9 items Scale in Turkish health care professionals

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Abstract

There is a need for a valid and reliable measurement tool that will detect the psychological symptoms of health care workers in the epidemic and pandemic periods that have been effective worldwide in recent years. This study has aimed to investigate the validity and reliability of the Stress and Anxiety to Viral Epidemics-9 items Scale (SAVE-9) in Turkish health care professionals. The study was carried out with 150 health care professionals. All participants were asked to complete the SAVE-9, Patient Health Questionnaire-9 (PHQ-9), Generalized Anxiety Disorder-7 (GAD-7), Brief Resilience Scale (BRS). The Cronbach's α coefficient was calculated. Also, exploratory and confirmatory factor analyses were used to evaluate the factor structure. The SAVE-9 scores positively correlated with the PHQ-9, GAD-7, and negatively correlated with the BRS. The exploratory and confirmatory factor analyses supported two-factor structure similar to the original scale. The first factor consists of five items (1, 2, 3, 4, 5, 8), and the second factor consists of three items (6, 7, 9). The Cronbach's α coefficient was found as 0.77. The Turkish version of SAVE-9 is a valid and reliable tool for Turkish health care professionals.

KEYWORDS
anxiety, COVID-19, epidemic, health care professionals, stress

1 | INTRODUCTION

Coronavirus disease 2019 (COVID-19) is a viral infection, affecting many organs and systems, with mortal effects. It was originated in Wuhan, China, and the World Health Organization declared a pandemic on March 11, 2020 (Holshue et al., 2020). In addition to its physical effects, it also has important economic, social and psychological effects. The psychological effects of COVID-19 are believed to be due to the direct impact of the infection on the human body or indirectly due to psychosocial problems caused by the pandemic (Kelly, 2020). COVID-19 is suggested to increase the neuroinflammatory response by activating the hypothalamus–pituitary–adrenal axis, causing intense physical and psychological stress; and long-term stress further increases neuroinflammation (Steardo & Verkhratsky, 2020). In light of this data, it has been suggested that psychological symptoms related to COVID-19 infection may occur employing mentioned direct or indirect pathways (Steardo & Verkhratsky, 2020).

Although COVID-19 affects all segments of society psychologically negatively, it significantly affects health care professionals who have intense physical activity in risky areas and come into direct contact with patients during the treatment of infection (Gold, 2020). Studies conducted in many countries fighting against the pandemic have reported that nearly half of health care professionals experience depression, anxiety, insomnia, burnout, and stress (Lai et al., 2020; Pappa et al., 2020). In addition, health care professionals working in pandemic services directly in contact with patients are reported to have more psychological problems (Zerbini et al., 2020). It is noted that psychological problems in health care professionals may also be associated with various physical symptoms, such as headaches, and may have a negative impact on the daily functioning of health care professionals (Chew et al., 2020). A study conducted in health care professionals in Turkey also found higher levels of anxiety, similar to those in the world, but also associated it with anxiety observed in their children (Şahin et al., 2020).

Maintaining the physical and mental health of health care professionals struggling with COVID-19, and in-creasing their resilience are also important issues in protecting community health (Walton et al., 2020). Early detection and intervention of psychological problems are important to protect and treat the psychological health of health care professionals during the pandemic (Greenberg et al., 2020; Santarone et al., 2020). Psychological symptom screening scales provide convenience for early detection of psychological symptoms. The measurement tools widely used in the screening, diagnosis, and treatment of many psychiatric disorders, also provide convenience in screening, detecting, and intervening in the psychological symptoms of health care professionals during the COVID-19 pandemic. The Stress and Anxiety to Viral Epidemics-9 items Scale (SAVE-9) for Health Care Profes-sionals was developed by Chung et al. (2020) to screen and identify psychological symptoms of health workers during a viral epidemic (Chung et al. 2020). This scale has been translated to several languages and was used in studies in different countries and the Japanese version of the scale has recently been shown to be valid in Japanese health care workers (Mosolova et al., 2020; Okajima et al., 2021; Tavormina et al., 2020). Akça and Bilgiç translated the scale to Turkish to be available for studies conducted in Turkey (Akça et al. 2020). SAVE-9 is a 9-item self-report scale screening anxiety and work-related stress associated with viral epidemics in health care professionals. The present study aims to test the validity and reliability of the Turkish version of SAVE-9 in a sample of health care professionals during the COVID-19 pandemic.

2 | METHODS

2.1 | Subjects

Health care professionals working as physicians, nurses, health officers, physiotherapists, psychologists, and an-esthesia technicians in primary, secondary, and tertiary health institutions were included in the study. Participants were recruited on a voluntary basis. Except for the presence of any physical disability that would prevent the participants from completing the research forms, no exclusion criteria were determined.

2.2 | Data collection tools

2.2.1 | Sociodemographic data form

Sociodemographic characteristics, such as age, gender, educational levels, profession, socioeconomic levels (determined according to yearly income), and COVID-19 infection condition (whether infected by COVID-19 previously or not) of the participants included in the study were determined by the sociodemographic data form developed by the researchers.

2.2.2 | The SAVE-9 for health care professionals

SAVE-9 was developed by Chung et al. (2020) to determine the level of anxiety and work-related stress of health care professionals specifically to the viral epidemic (Chung et al. 2020). The 5-point Likert-type scale consists of nine items. It has a two-factor structure that evaluates anxiety associated with viral epidemics and work-related stress during a viral epidemic. The cut-off point of the scale was 22, while the cut-off point of the anxiety subscale was 15. The Cronbach's α coefficient of the scale was found as 0.79.

2.2.3 | Patient Health Questionnaire-9

Patient Health Questionnaire-9 (PHQ-9) is a 9-item self-report questionnaire, developed by Spitzer et al. (2000) to evaluate symptoms of depression. It is a 4-point Likert-type scale. According to the scores taken from the questionnaire, 0–4 points indicate minimal depression, 5–9 points indicate mild depression, 10–14 points indicate moderate depression, 15–19 points indicate moderate–severe depression, and 20 and above indicate severe depression. The Cronbach's α coefficient of the scale was found as 0.84 in the validity and reliability study for the Turkish version (Sari et al., 2016).

2.2.4 | Generalized Anxiety Disorder-7

Generalized Anxiety Disorder-7 (GAD-7) consists of seven items to evaluate symptoms of general anxiety and was developed by Spitzer et al. (2006). It is a 4-point Likert-type scale. According to the scores taken in the scale, 0–5 points indicate minimal anxiety, 5–9 points indicate mild anxiety, 10–14 points indicate moderate anxiety, and 15–21 points indicate severe anxiety. The Cronbach's α coefficient of the scale was found as 0.85 in the validity and reliability study for the Turkish version (Konkan et al., 2013).

2.2.5 | Brief Resilience Scale

Brief Resilience Scale (BRS) is a self-report scale aimed at measuring the resilience of individuals which was developed by Smith et al. (2008). The 5-point Likert-type scale consists of six items. Higher scores in the scale indicate higher resilience in individuals. The Cronbach's α coefficient of the scale was found as 0.83 in the validity and reliability study for the Turkish version (Doğan, 2015).

2.3 | Procedure

The study was approved by the ethics committee of Necmettin Erbakan University with the number 2020-2625. Permission was obtained from Prof. Dr. Seockhoon Chung and the translation and adaptation process were started. SAVE-9 has been translated into many languages and has been validated in Russian, Italian, and Japanese language (Mosolova et al., 2020; Tavormina et al., 2020; Okajima et al., 2021). The validity study of the English form of the scale is ongoing. The Turkish form of the scale used in this study was obtained by translation from the English form.

First, a professor of child and adolescent psychiatry (A. B.), who has a good command of English, has translated the scale items into Turkish. Then, a different professor of child and adolescent psychiatry (Ö. F. A.), who has a good command of English, translated the scale back into English. Prof. Dr. Seockhoon Chung reviewed the revised translation of the scale and noted that it closely resembles the original scale. Before the data collection tools were applied, the participants were informed about the purpose of the research, and verbal and written consents were obtained from the respondents who participated in the study. All participants were asked to fill out the sociodemographic data form, SAVE-9, PHQ-9, GAD-7, and BRS scales. The sample collection period of the study lasted for 6 months (June 2020–December 2020).

2.4 | Statistical analysis

The SPSS 20.0 (Statistical Package for the Social Sciences) was used for the analysis of the data obtained in the study. The Kolmogorov–Smirnov test was used to test the normality. Comparison analyses were conducted using the Mann–Whitney U test since the test data were not normally distributed. The Pearson correlation test was performed to examine the relationship between scores of the psychometric scales. Internal consistency of the scale was investigated by the Cronbach's α method. Exploratory and confirmatory factor analyses were used to test the factor structure of the scale. The principal component analysis according to Kaiser normalized varimax conversion was used in the exploratory factor analysis. The comparative fit index (CFI), goodness-of-fit index (GFI), and Tucker–Lewis Index (TLI) were expected to be above 0.95, and the root mean square error of approximation (RMSEA) was expected to be below 0.05 to consider the model fit is acceptable in the confirmatory factor analysis. The significance value was accepted as $p < 0.05$ in the 95% confidence interval.

3 | RESULTS

A total of 150 health care professionals participated in this study, of which 54 (36%) were male and 96 (64%) were female. The medical professions and sociodemographic characteristics of the participants are shown in Table 1.

3.1 | Reliability analysis

To evaluate the internal consistency of SAVE-9, Cronbach's α coefficient and item-total correlation was used. In the reliability analysis to determine the internal consistency between items of the original form of the SAVE-9, Cronbach's α coefficient was found as 0.77. In the correlation analyses, each scale item was found to correlate positively with other scale items (correlation coefficients for inter-item correlations were between 0.15 and 0.75 except for three insignificant correlations) and the total score of the scale (correlation coefficients for item-total correlations were between 0.44 and 0.76).

TABLE 1 Sociodemographic data of the participants

Variables	Participants (n = 150)
Gender	
Male n (%)	54 (36%)
Female n (%)	96 (64%)
Age (Mean ± SD)	32.49 ± 8.88
Education levels	
High school n (%)	9 (6%)
University n (%)	141 (94%)
Socioeconomic status	
Low n (%)	2 (1.3%)
Middle n (%)	37 (24.7%)
High n (%)	111 (74%)
Occupation	
Physician n (%)	79 (52.7%)
Nurses/medical assistants n (%)	63 (42%)
Physiotherapists n (%)	4 (2.7%)
Psychologists n (%)	3 (2%)
Anesthesia technician n (%)	1 (0.7%)
COVID-19 history	
Yes n (%)	14 (9.3%)
No n (%)	136 (90.7%)
COVID-19 contact history	
Yes n (%)	100 (66.7%)
No n (%)	50 (33.3%)

Abbreviations: COVID-19, coronavirus disease 2019; SD, standard deviation.

3.2 | Validity analysis

In a criteria-based validity analysis to evaluate the validity of the SAVE-9, the relationship between external criteria GAD-7, PHQ-9, and BRS was investigated. In the analyses, it was found that there were statistically significant correlations between SAVE-9 and other scales used in the study (Table 2). A positive correlation was found between the SAVE-9 total score and the total scores of GAD-7 (r = 0.45, p < 0.001) and PHQ-9 (r = 0.41, p < 0.001), while there was a negative correlation with the total score of BRS (r = −0.23, p = 0.005).

Exploratory factor analysis was performed to evaluate the validity of the SAVE-9. First, the suitability of the SAVE-9 for exploratory factor analysis was evaluated and found to be suitable for exploratory factor analysis (Kaiser-Meyer-Olkin = 0.783; χ^2: 404.525; p < 0.001). As a result of the analysis, a two-factor structure was obtained. The first factor consists of six items (1, 2, 3, 4, 5, and 8), and the second factor consists of three items (6, 7, and 9).

The factor distributions and item loads obtained as a result of the exploratory factor analysis are given in Table 3. As a result of the confirmatory factor analysis, a two-factor structure was obtained in accordance with the

TABLE 2 Correlations between SAVE-9 and other scales

Variables	SAVE-9	GAD-7	PHQ-9	BRS
SAVE-9	1			
GAD-7	0.45**	1		
PHQ-9	0.41**	0.76**	1	
BRS	−0.23*	−0.54**	−0.53**	1

Abbreviations: BRS, Brief Resilience Scale; GAD-7, Generalized Anxiety Disorder-7 items scale; PHQ-9, Patient Health Questionnaire-9 items scale; SAVE-9, Stress and Anxiety to Viral Epidemics-9 items for health care workers.
*$p < 0.01$; **$p < 0.001$.

TABLE 3 Item scores and factor analysis findings of SAVE-9

Factors	Items	Mean (SD)	EFA	Skewness (SE)	Kurtosis (SE)
Factor 1	SAVE-9 Item 1	2.34 (1.09)	0.74	−0.27 (0.19)	−0.29 (0.39)
	SAVE-9 Item 2	2.44 (1.03)	0.80	−0.34 (0.19)	−0.10 (0.39)
	SAVE-9 Item 3	2.81 (1.05)	0.80	−0.75 (0.19)	0.16 (0.39)
	SAVE-9 Item 4	2.37 (1.08)	0.68	−0.46 (0.19)	−0.33 (0.39)
	SAVE-9 Item 5	1.62 (1.20)	0.53	0.42 (0.19)	−0.58 (0.39)
	SAVE-9 Item 8	3.43 (0.89)	0.68	−2.00 (0.19)	4.44 (0.39)
Factor 2	SAVE-9 Item 6	1.17 (1.28)	0.76	0.94 (0.19)	−0.15 (0.39)
	SAVE-9 Item 7	1.00 (1.05)	0.65	0.91 (0.19)	0.18 (0.39)
	SAVE-9 Item 9	1.96 (1.43)	0.65	−0.01 (0.19)	−1.36 (0.39)

Abbreviations: EFA, exploratory factor analysis; SAVE-9, Stress and Anxiety to Viral Epidemics-9 items for health care workers; SD, standard deviation, SE, standard error.

results of exploratory factor analysis and it was observed that it had good fit values (TLI = 0.98, CF = 0.99, RMSEA = 0.04). Figure 1 shows the SAVE-9 scale confirmatory factor analysis factor diagram.

4 | DISCUSSION

This study aims to test the validity and reliability of the Turkish form of the SAVE-9 in health care professionals. In the validity and reliability analyses, the Turkish version of the SAVE-9 was found to be a valid and reliable scale in health care professionals in Turkey.

4.1 | Reliability

Assessment of scale internal consistency is one of the methods that assess the homogeneity of the items on the scale, and test whether the scale is reliable (Karakoç & Dönmez, 2014). One of the methods of measuring internal consistency for Likert-type scales is the calculation of the Cronbach's α coefficient (Ercan & Kan, 2004). In our study, the Cronbach's α value was found as 0.77. The Cronbach's α value of the original scale was 0.79 (Chung et al. 2020). A Cronbach's α value higher than 0.70 indicates a good internal consistency for a scale (Karakoç & Dönmez,
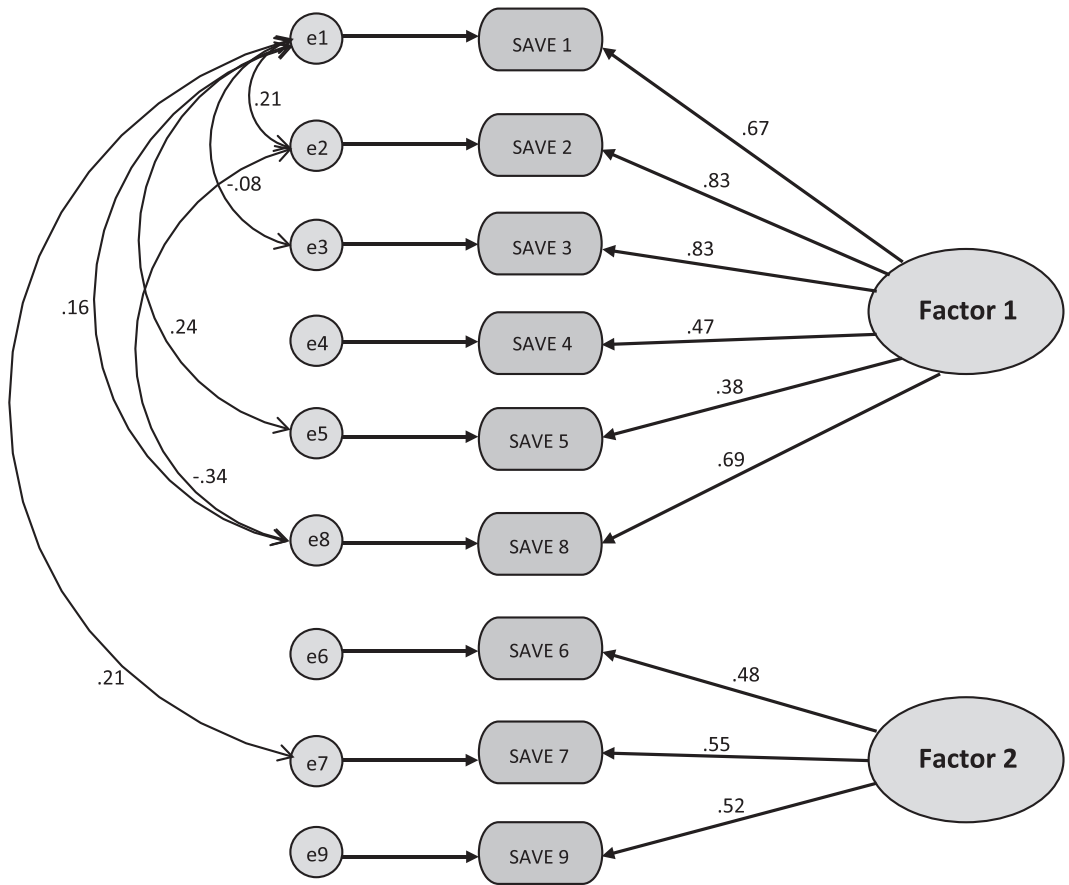
FIGURE 1 Factor diagram of the confirmatory factor analysis for Stress and Anxiety to Viral Epidemics-9 (SAVE-9)

2014). In addition, the inter-item and item-total correlations were examined to assess the internal consistency of the SAVE-9. As a result of these analyses, all scale items were found to have positive correlations with each other (except for three insignificant correlations) and total score of the scale. According to the findings of our research, it can be stated that SAVE-9 has a good level of reliability. Similar to our results, the Japanese version of SAVE-9 has good internal consistency (McDonald's ω value = 0.91; Okajima et al., 2021).

4.2 | Validity

Various methods, such as content validity, construct validity, and criterion-related validity are used to test the validity of a scale (Ercan & Kan, 2004). While developing the original form of the scale, Chung et al. (2020) investigated the relationship between SAVE-9 and PHQ-9, GAD-7 and found a significant relationship between SAVE-9 and other scales (Chung et al. 2020). In our study, a positive correlation was found between SAVE-9 and PHQ-9 and GAD-7. Similarly, a positive correlation was found between SAVE-9 and GAD-7 in the Japanese version of SAVE-9 (Okajima et al., 2021). It is known that low individual resilience is an important factor in the emergence of psychological symptoms (Hjemdal et al., 2006). For this reason, the relationship between SAVE-9 and BRS was evaluated and a negative correlation was found. This finding supports the role of resilience in the emergence of psychological symptoms.

Factor analysis is one of the most commonly used methods to evaluate construct validity (Tavşancıl, 2002). The factor analysis allows to collect scale items under certain headings by evaluating whether the responses of respondents are in a specific order (Tavşancıl, 2002). In our study, the exploratory factor analysis was applied and a two-factor structure was obtained, similar to the original form and the Japanese version of the SAVE-9 (Okajima et al., 2021).

Psychiatric diagnosis and psychological symptoms were not determined by one-to-one interviews with participants is a limitation for this study. Also, the sample size may seem as a limitation. But the sample size was determined by considering the literature findings regarding the number of samples required for exploratory and confirmatory factor analysis. It is reported that the minimum sample size for these analyses is ten times the number of items in the scale analyzed (MacCallum et al., 1999). Considering this information, we have assumed that the sample size of our study is sufficient. Also, the fact that the participants in the sample are from different clinics and professional groups is considered important for the generalization of the results.

As a result, SAVE-9 is considered a valid and reliable scale for screening anxiety and work-related stress that may be associated with viral epidemics in Turkish health care professionals. In line with the literature we could access, there is no other measurement tool in Turkey that screens the mental symptoms of health care professionals specifically in response to viral epidemic. In this context, it is believed that our study can help the screening and early detection of psychological symptoms of health care professionals working under difficult conditions during a viral epidemic and pandemic, especially COVID-19, and contribute preventing potential loss of labor force and individual functioning. In addition, it is also believed that this study will contribute to future research in this area.

CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests.

PEER REVIEW

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DATA AVAILABILITY STATEMENT

Data are available on request due to privacy or other restrictions.

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