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Factorial Validity of the Arabic Version of the Stress and Anxiety to Viral Epidemics-6 Items (SAVE-6) Scale among the General Population in Lebanon

Youjin Hong [1], **Soyoung Yoo** [2], **Hussein Walid Mreydem** [3], **Bayan Tarek Abou Ali** [3], **Nada Omar Saleh** [3], **Sajida Fawaz Hammoudi** [3], **Joohee Lee** [4], **Sooyeon Suh** [5] and **Seockhoon Chung** [4]

[1]Department of Psychiatry, GangNeung Asan Hospital, University of Ulsan College of Medicine, Gangneung, Korea
[2]Department of Convergence Medicine, University of Ulsan College of Medicine, Seoul, Korea
[3]Faculty of Medical Sciences, Lebanese University, Fanar, Lebanon
[4]Department of Psychiatry, Asan Medical Center, University of Ulsan College of Medicine, Seoul, Korea
[5]Department of Psychology, Sungshin Women's University, Seoul, Korea

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Address for Correspondence:
Seockhoon Chung, MD, PhD
Department of Psychiatry, Asan Medical Center, University of Ulsan College of Medicine, 88 Olympic-ro 43-gil, Songpa-gu, Seoul 05505, Korea.
E-mail: schung@amc.seoul.kr

ORCID iDs
Youjin Hong
https://orcid.org/0000-0002-1062-1658
Soyoung Yoo
https://orcid.org/0000-0002-2953-508X
Hussein Walid Mreydem
https://orcid.org/0000-0002-0963-5139
Bayan Tarek Abou Ali
https://orcid.org/0000-0002-8920-2957
Nada Omar Saleh
https://orcid.org/0000-0002-2795-3448
Sajida Fawaz Hammoudi
https://orcid.org/0000-0002-6315-9209
Joohee Lee
https://orcid.org/0000-0002-3114-1944
Sooyeon Suh
https://orcid.org/0000-0003-0644-8634
Seockhoon Chung
https://orcid.org/0000-0002-9798-3642

ABSTRACT

This study explored the psychometric properties of the Arabic version of the Stress and Anxiety to Viral Epidemics-6 items (SAVE-6) scale for assessing people's anxiety in response to the viral epidemic in Lebanon. The 406 participants responded voluntarily to the online survey that included the SAVE-6, Generalized Anxiety Disorder-7 (GAD-7), and Patient Health Questionnaire-9 (PHQ-9) tools. The single-structure SAVE-6 model showed good internal consistency (Cronbach's $\alpha = 0.773$). The SAVE-6 scale also showed good convergent validity with the GAD-7 (Spearman's $\rho = 0.42$, $P < 0.001$) and PHQ-9 ($\rho = 0.38$, $P < 0.001$). Receiver operating characteristic (ROC) analysis revealed an Arabic SAVE-6 cut-off score of 12 points (area under the curve [AUC] = 0.753; sensitivity = 62.74%; specificity = 78.26%) for an at least mild degree of anxiety (GAD-7 score ≥ 5). The Arabic version of the SAVE-6 was a reliable, valid, and solely usable scale for measuring the anxiety response of the general population to the viral epidemic.

Keywords: COVID-19; SAVE-6; Anxiety; Arabic

The first case of the virus was reported in Lebanon on February 25, 2020. Intensive governmental control at an early stage led to the suppression of virus spread, as the number of cases did not exceed 20 per day until May 2020. However, the economic difficulties forced the government to loosen this lockdown. In year-end vacations, specifically in December 2020, the country opened without any restrictions, which resulted in a sharp increase in the number of coronavirus disease 2019 (COVID-19)-positive cases. The government has confirmed 461,062 cases and 6,096 related deaths nationwide as of March 28, 2021, and has allowed limited easing of the lockdown on movement and public services to combat the spread of COVID-19.[1]

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Disclosure

The authors have no potential conflicts of interest to disclose.

Author Contributions

Conceptualization: Chung S, Suh S. Data curation: Mreydem HW, Abou Ali BT, Saleh N, Hammoudi SF. Formal analysis: Chung S, Suh S. Investigation: Chung S. Methodology, Chung S, Mreydem HW. Software: Chung S. Validation, Yoo S, Hong Y, Lee J. Writing - original draft: Hong Y, Chung S. Writing - review & editing: Yoo S, Mreydem H, Abou Ali BT, Saleh N, Hammoudi SF, Lee J.

In this pandemic era, it is meaningful to develop a rating scale to measure peoples' stress or anxiety in response to the viral epidemic. Recently, the Stress and Anxiety to Viral Epidemics-6 items (SAVE-6) scale was developed in South Korea as a tool to assess such anxiety in the general population.[2] The tool is based on factor I (anxiety about the viral epidemic) from the original SAVE-9 scale that was developed for healthcare workers.[3] This study aimed to explore the psychometric properties of the Arabic version of the SAVE-6 scale as a tool for assessing anxiety in response to the viral epidemic among university students in Lebanon.

This anonymous online survey study was performed in Lebanon. Participants were recruited via an online post that included the study's objective and enrollment procedure. All 406 participants were members of the general population and voluntarily participated in the study from March 17–28, 2021. The respondents answered to the questionnaire including the SAVE-6, Generalized Anxiety Disorder-7 (GAD-7), and Patient Health Questionnaire - 9 (PHQ-9) scales. The SAVE-6 scale is a subcategory of the SAVE-9 scale[3] originally developed to assess work-related stress and anxiety responses among healthcare workers to the COVID-19 pandemic. The Arabic version of the SAVE-9 was translated and back-translated[4] previously (**Supplementary Data 1**). The GAD-7 is a self-administered, 7-item questionnaire used to measure general anxiety,[5] and the PHQ-9 is a self-rated, 9-item questionnaire used to measure the degree of depression.[6]

We hypothesized a one factor model for the Arabic version of the SAVE-6 scale based on our previous analysis with healthcare workers.[3] The assumption of the normality was checked using skewness and kurtosis with acceptable range ± 2.[7] Sampling adequacy and data suitability was examined using the Kaiser–Meyer–Olkin (KMO) and Bartlett's test of sphericity. To evaluate the construct validity, the exploratory factor analysis (EFA) with principal axis factor (PAF) extraction, a Pearson correlation matrix, promax, and an oblique rotation was conducted. To determine the number of factors to retain, a screen test and parallel analysis,[8-10] based on Minimum Rank Factor Analysis (MRFA), with a 95 percentile threshold based on the polychoric correlations matrix was conducted by using FACTOR 10.10.03. program.[11] The reliability and internal consistency of the factor was examined using Cronbach's α and McDonald's ω. Finally, the receiver operating characteristics (ROC) analysis was done to explore the appropriate cut-off score of the SAVE-6 in accordance with generalized anxiety symptoms. Independent *t*-tests were used to examine the differences in the Arabic version of the SAVE-6 scale scores in sex (male vs. female); experience of being infected (yes vs. no); experience of being quarantined (yes vs. no); feeling anxious (GAD-7 ≥ 5, yes vs. no); feeling depressed (PHQ-9 score ≥ 10, yes vs. no); and history of depression, anxiety, or insomnia (yes vs. no). Spearman's correlation analysis was done to explore the convergent validity of the Arabic version of the SAVE-6 with PHQ-9 and GAD-7 scales using SPSS 21.0.

A total of 406 participants were included in this study. Among them, 82.0% were female and 77.1% were juniors (less than 40 years of age) (**Table 1**). The respondents lived in Beirut (n = 54, 13.3%), Mount Lebanon (n = 45, 11.1%), North (n = 21, 5.2%), Akkar (n = 8, 2.0%), South (n = 24, 5.9%), Nabatieh (n = 15, 3.7%), Beqaa (n = 228, 56.2%), and Baalbek-Hermel (n = 11, 2.7%). Among the participants, 53.2% were assessed as having clinical depression (PHQ-9 ≥ 10), and 38.7% as having clinical anxiety (GAD ≥ 10). The Arabic SAVE-9 scale scores was significantly higher in female (vs. male, t[374] = 2.267; $P = 0.024$), participants with past psychiatric history (t[404] = 2.154, $P = 0.032$), and those with current psychiatric symptoms (t[404] = 5.654, $P < 0.001$). There were no significant differences in SAVE-9 scale scores for age (junior vs. senior), marital status (single vs. married), quarantine experience,

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Table 1. Demographic characteristics of the participants (n = 406)

Variables	Values
Sex (female)	333 (82.0)
Age, yrs	29.3 ± 12.5
Junior (18–39 years)	313 (77.1)
Senior (40+ years)	93 (22.9)
Marital status	
Single	240 (59.1)
Married	150 (36.9)
Final educational level	
Primary (elementary school)	16 (3.9)
Secondary (middle or high school)	67 (16.5)
University	323 (79.6)
Did you have experience or have been treated for depression, anxiety, or insomnia? (Yes)	152 (30.8)
Do you think that you are currently depressed or anxious or do you need help for your mood? (Yes)	225 (55.4)
Were you infected with COVID-19? (Yes)	149 (36.7)
Did you experience being quarantined due to infection with COVID-19? (Yes)	218 (53.7)
Rating scales	
SAVE-6	11.7 ± 4.4
PHQ-9	10.6 ± 5.8
Depression (PHQ-9 ≥ 10)	216 (53.2)
GAD-7	8.9 ± 5.3
Generalized anxiety (GAD-7 ≥ 10)	157 (38.7)

Values are presented as mean ± standard deviation or number (%).
COVID-19 = coronavirus disease 2019, SAVE-6 = Stress and Anxiety to Viral Epidemics-6 items, PHQ-9 = Patient Health Questionnaire-9, GAD-7 = Generalized Anxiety Disorder-7.

or experience with infection. The normality assumption was checked and the distribution of items were within the normal limit (**Table 2**). The KMO measure (0.82) and Bartlett's test of sphericity ($P < 0.001$) showed adequacy for running EFA. The EFA suggested one factor model of the SAVE-6 scale based on eigenvalue above 1.00 (eigenvalue = 2.858, 47.6% of the variance). A scree test and parallel analysis suggested the single factor structure (real-data eigenvalue = 64.24, 95 percentile of random eigenvalue = 45.70) of the Arabic version of SAVE-6. We also observed that the SAVE-6 has good internal consistency (Cronbach's $\alpha = 0.773$, McDonald's $\omega = 0.781$).

The Arabic version of SAVE-6 scale showed the good convergent validity of this tool compared to the GAD-7 scale (Spearman's $\rho = 0.42$, $P < 0.001$) and the PHQ-9 ($\rho = 0.38$, $P < 0.001$), respectively. The SAVE-6 scale score was significantly higher among those with depression (PHQ-9 ≥ 10, $t[404] = 6.457$, $P < 0.001$) and generalized anxiety (GAD-7 ≥ 5, $t[404] = 7.801$, $P < 0.001$). The ROC analysis revealed a cut-off score for the SAVE-6 of 12 points (area under the

Table 2. Subject responses to each item of the Arabic SAVE-6 scale

Items	Responses					Skewness	Kurtosis	Mean ± SD	Loading
	Never	Rarely	Sometimes	Often	Always				
1. Are you afraid the virus outbreak will continue indefinitely?	67 (16.5%)	45 (11.1%)	160 (39.4%)	97 (23.9%)	37 (9.1%)	−0.238	−0.656	1.98 ± 1.17	0.69
2. Are you afraid your health will worsen because of the virus?	58 (14.3%)	78 (19.2%)	166 (40.9%)	79 (19.5%)	25 (6.2%)	−0.061	−0.528	1.84 ± 1.09	0.79
3. Are you worried that you might get infected?	47 (11.6%)	55 (13.5%)	172 (42.4%)	90 (22.2%)	42 (10.3%)	−0.176	−0.420	2.06 ± 1.11	0.80
4. Are you more sensitive toward minor physical symptoms than usual?	80 (19.7%)	54 (13.3%)	170 (41.9%)	88 (21.7%)	14 (3.4%)	−0.239	−0.758	1.76 ± 1.10	0.69
5. Are you worried that others might avoid you even after the infection risk has been minimized?	181 (44.6%)	74 (18.2%)	118 (29.1%)	25 (6.2%)	8 (2.0%)	0.623	−0.592	1.03 ± 1.08	0.50
6. Do you worry your family or friends may become infected because of you?	11 (2.7%)	6 (1.5%)	69 (17.0%)	191 (47.0%)	129 (31.8%)	−1.129	1.874	3.04 ± 0.89	0.64

SD = standard deviation, SAVE-6 = Stress and Anxiety to Viral Epidemics-6 items.

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curve [AUC] = 0.753, sensitivity = 62.74%, specificity = 78.26%), which corresponded to an at least mild degree of anxiety based on the GAD-7 scale (≥ 5).

The SAVE-9 scale was developed to measure anxiety response to the viral epidemic, and it consists of items asking one's measure one's worry or thinking of the risk of infectivity, resultant influence on physical health, or avoidance among each other. In this sample, we observed that the proportion of "never" responses to item 5 ("Are you worried that others might avoid you even after the infection risk has been minimized?") was too high (44.6%), although we also observed a high proportion of this response (27.8%) in our previous study conducted in South Korea.[2] The factor loading value of the item 5 was 0.50 (**Table 2**). Usually over 0.6 was acceptable factor loading value,[12] but item of 0.5 of factor loading value also can be acceptable if the composite reliability over 0.6.[13] In this study, since the SAVE-6 scale showed good composite reliability, we accept the item 5 to be included in the final single-structure model of the SAVE-6. The survey was conducted after the second wave of the COVID-19 pandemic, when hospitals were full and the number of deaths had significantly increased. And, this finding may be attributed to the adaptation of the participants in this study to the prolonged pandemic and lockdown in Lebanon.

In this study, we determined that an Arabic version of the SAVE-6 scale score of 12 points (sensitivity = 62.74%, specificity = 78.26%) as a cut-off for an at least mild degree of generalized anxiety, as indicated by a GAD-7 score of ≥ 5. The sensitivity was relatively low in this sample when we define the 12 point of SAVE-6 as a cut-off. It might come from that the proportion of participants who were rated as GAD-7 ≥ 5 is so high (n = 314, 77.3%) in this sample. Lebanon people are in the situation of triple crises of COVID-19 pandemic, the Beirut explosion, and economical crises. A more severe pandemic situation in Lebanon may have influenced the lower SAVE-6 scale cut-off score. Previously, among healthcare workers, for whom the original SAVE-9 scale was developed,[3] the optimal cut-off score for factor I (anxiety about the viral epidemic) was ≥ 15 points. In other studies, on the Korean version of the SAVE-6 scale applied to the general population, SAVE-6 scores of 15 (sensitivity = 70.7%, specificity = 60.0%) and 17 points (sensitivity = 72.5%, specificity = 71.3%) were consistent with at least mild (≥ 5) and moderate (≥ 10) degrees of anxiety according to the GAD-7 scale,[2] respectively. A more severe pandemic situation in Lebanon may have influenced the lower SAVE-6 scale cut-off score.

One limitation of this study was its online anonymous survey design. Face-to-face interviews are challenging to perform in Lebanon owing to recurrent lockdowns due to the COVID-19 pandemic. Moreover, the anonymous design may have resulted in misleading responses. Second, the preponderance of women and young individuals may have influenced the results. Third, the survey was performed in March of 2021 when people may have adapted to the fear or anxiety regarding the COVID-19 pandemic; i.e., the new-normal era. Fourth, test-retest reliability was not assessed.

In conclusion, the Arabic version of the SAVE-6 is a reliable, valid, and solely usable scale for measuring the anxiety response of the general population to a viral epidemic. In this pandemic era, a viral epidemic-specific rating scale is needed; in this context, the SAVE-6 scale can be applied to the general population.

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Ethics statement

The study protocol was approved by the Institutional Review Board of the University of Ulsan (2021-R0022-001), which waived the requirement for written informed consent.

SUPPLEMENTARY MATERIAL

Supplementary Data 1

Stress and Anxiety to Viral Epidemics - 6 items (SAVE-6) for general population Arabic version

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