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Validation of the Persian Version of the Self-care in COVID-19 Scale (SCOVID Scale) in the Iranian Population

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Abstract

Background: Self-care during Coronavirus Disease 2019 (COVID-19) helps people follow self-care strategies to reduce the spread of the virus. To control the disease, people need to engage in self-care behaviors, which should be investigated by a valid and reliable instrument to yield valid and credible results.

Objectives: This study aimed to validate the Persian version of the Self-Care in COVID-19 Scale (SCOVID Scale).

Methods: The sample included 582 participants from Tehran's general population, selected through convenience sampling in 2021. They were divided into two groups, one for exploratory factor analysis (EFA) and the other for confirmatory factor analysis (CFA). Cronbach's alpha coefficient and McDonald's omega were used to assess the internal consistency. Standard error of measurement and the interclass correlation coefficient were also employed to examine absolute and relative stability, respectively.

Results: In the EFA, three factors, including Precaution, Routine Activities, and Lifestyle, were extracted, explaining 32.31% of the total variance in COVID-19 self-care. Internal consistency of the whole scale using both Cronbach's alpha coefficient and McDonald's omega was above 0.7. The goodness of fit indices of the second-order CFA were in the acceptable range (x^2=262.365, df=82, P<0.001, RMSEA=0.062, PCFI=0.725, PNFI=0.703, IFI=0.930, and the CFI=0.929).

Conclusion: The Persian version of the SCOVID Scale is a valid and reliable instrument that can be used in studies on COVID-19.

Keywords: COVID-19, Iran, Reliability, SCOVID, Self-care, Validity

1. Background

Pneumonia with unknown causes was first reported in Wuhan, China, in December 2019 (1). Shortly afterward, the new coronavirus disease 2019 (COVID-19) was confirmed to be the cause of a pandemic in China and many parts of the world (2). This pandemic became a public health emergency (3). According to the latest report of the World Health Organization (WHO), more than 650 million cases of COVID-19 have been diagnosed since the pandemic's beginning, and more than three million new cases have been identified in the last week of December 2022. In total, there have been more than 6 million deaths, reaching more than 10 thousand people in the last week of December 2022. Iran ranks 18th in the world with more than 7.5 million cases and 144,667 deaths; there were 334 new cases, with nine deaths in the last week of December (4).

COVID-19 still influences many people's lives worldwide, and Iran has experienced several deadly pandemic waves. In 80% of the cases, symptoms are mild and treatable, but in other cases, they are severe and may lead to death (5). International health organizations have introduced guidelines to reduce the risk of contracting the virus (3, 6). Further attention has also been paid to self-care behaviors, which aim at preventing disease and protecting well-being (7). Self-care during COVID-19 refers to a decision-making process to prevent the contraction of the virus and promote well-being (8). People must follow self-care strategies to minimize the risk of spreading the virus (5). Many aspects of COVID-19 are still unknown; therefore, self-care behaviors should be based on recommendations for other viral diseases, such as the Middle East Respiratory Syndrome, and continue for two weeks (5, 6). The outbreak of the subsequent waves of COVID-19 in some countries, including Iran, and the successful control of it in some other countries show that controlling the pandemic depends on several essential factors, such as physical distancing, isolation, tracing and testing, wearing the mask, washing hands, and adherence to self-care behaviors by patients (9, 10). To control the disease, people need to engage in self-care behaviors, which should be investigated by a valid and reliable instrument to yield valid and credible results.

The SCOVID developed by De Maria et al. assesses different aspects of self-care, including individual protective measures, social distancing, environmental disinfection, psychological well-being, and a healthy lifestyle (7). This instrument

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allows health professionals to promote self-care behaviors to prevent contraction with the virus and changes in people's psychological well-being. Measurement of self-care behaviors during COVID-19 or future pandemics requires a valid and reliable instrument. Since SCOVID is currently the only available tool, validating its Persian version can help Iranian researchers continue their investigations in this field.

2. Objectives

The present study aims to examine the psychometric properties of the Persian version of the SCOVID.

3. Methods

3.1. Participants

The sample included 582 participants from Tehran's general population in 2021, who were selected through convenience sampling. The inclusion criteria were 1) the ability to read and write and 2)18 years of age or above. On the other hand, unwillingness to stay in the study was considered an exclusion criterion. The sample was randomly assigned to either the exploratory factor analysis (EFA) or the conformity factor analysis (CFA) group (11). Tehran was selected because it has a culturally and ethnically diverse population, thereby representing the Iranian population properly. After explaining the study objectives to the participants and obtaining their consent, the questionnaires were distributed among them (in public places, such as parks and markets). Moreover, the participants were assured that their personal information would remain confidential.

Sample-to-item ratio criteria were utilized to determine the sample size, based on which the ratio should be 5-10 samples to each item (12). Because the number of questionnaire items was 20, more than 200 participants had to be recruited for this study. On the other hand, for CFA, it is recommended that the sample size should not be less than 200 participants. Accordingly, 582 participants were selected in public places using convenience sampling.

3.2. Measures

The SCOVID included 20 items and five dimensions, including Individual Protective Measures (4 items), Social Distancing (4 items), Environmental Disinfection (3 items), Psychological Well-being (5 items), and Healthy Lifestyle (4 items). The items were ranked on a 5-point Likert scale varying from 1 (never) to 5 (always). A higher score indicates better self-care behaviors (7).

3.3. Translation process

In the first step, permission was obtained from the original author to translate the instrument into Persian. The scale was then independently translated from English to Persian by two bilingual translators (one with medical education and the other with non-medical education) using the Forward-Backward method. The research team compiled the final Persian version by comparing the two translated versions. In the next step, the final Persian version was translated into English by two other bilingual translators (with English language education) (13). Both versions, along with the final version, were then sent back to the original developer of the scale. The developer provided feedback on the translation, which was applied to the scale.

3.4. Validity

The Persian version of the scale was sent to 10 people selected from the general population using convenience sampling to examine face validity. They were asked to answer the items and indicate which items were unclear or difficult to understand. The instrument was examined by five experts (in nursing, health, methodology, psychology, and psychiatry) to confirm content validity.

3.5. Ceiling and floor effects

Ceiling and floor effects were calculated to ensure the scale's content validity. If more than 15% of participants obtained the lowest or the highest score, floor and ceiling effects were considered present, respectively (14).

3.6. Statistical analysis

The IBM® SPSS® Amos™ (version 24) was utilized to conduct the CFA, and the SPSS® (version 20, Armonk, NY: IBM Corp.) was employed for other analyses. The participants' demographic characteristics were reported using mean, standard deviation, frequency, and percentage. Continuous data were reported using mean and standard deviation, while categorical data were described using frequency and percentage.

The EFA was used to evaluate the construct validity. Sampling adequacy was examined using Kaiser-Meyer-Olkin (KMO). The KMOs ranging from 0.7 to 0.8 are considered good, and those from 0.8 to 0.9 are excellent. High values of KMO (more than 0.7) show that factor analysis is suitable for the data. Bartlett's test of sphericity was used to assess the correlational matrix between variables. Latent variables were extracted using Maximum likelihood and Promax rotation. A cut-off point of 0.30 was considered for factor loadings. The first-order CFA was conducted on 300 participants. At this stage, the indices of parsimonious comparative fit index (PCFI), comparative fit index (CFI), normed fit index (NFI), incremental fit index (IFI), root mean square error of approximation (RMSEA), and minimum discrepancy function by degrees of freedom divided (CMIN/DF)

were calculated (15).

Second-order factor analysis was conducted given that the current constructs can show parts of a more general concept and that the dimensions extracted from the respective concept are indicators of a more general concept related to COVID-19 self-care. In the second-order CFA, it is emphasized that latent variables extracted in the first stage reflect another conceptual level; therefore, second-order factor analysis can reflect more general concepts at upper levels (16). The extracted dimensions of the SCOVID express the more general concepts of the scale. Therefore, a second-order CFA was performed after the first-order factor analysis.

3.7. Convergent and divergent validity assessment

Convergent and divergent validity were assessed using Fornell and Larcker criterion through construct reliability (CR), maximum shared squared variance (MSV), and average variance extracted (AVE). Convergent validity is present when items of a scale are highly correlated, and divergent validity is present when they are separated from each other (17). An AVE of >0.5 must be present for establishing convergent validity, and the MSV<AVE must be present for confirming divergent validity (18, 19). Afterward, CR (the replacement for Cronbach's alpha in structural equation modeling) and Maximum Reliability H (MaxR H) were calculated for which values higher than 0.7 and 0.8 are acceptable, respectively (20).

3.8. Reliability assessment

Internal consistency was examined using Cronbach's alpha coefficient and McDonald's omega to investigate the scale's reliability (21), for both of which values higher than 0.7 are acceptable (22).

4. Results

The mean age of the participants was 34.55±12.26 years, ranging from 18 to 88 years. Most participants were female, employed, had a college education, and had good health. Other demographic characteristics are reported in Table 1.

In factor analysis using Maximum Likelihood and Promax rotation methods, three factors were extracted, including Precaution (Items #1, #2, #5, #6, #7, #12, #13, and #20), Routine Activities (Items #10, #15, #18, and #19), and Lifestyle (Items #4, #8, and #9), which explained 32.31% of the total variance in COVID-19 self-care. The three factors had eigenvalues of 2.423, 1.342, and 1.075, respectively. Five items were not loaded on any factor (Table 2). In addition, ceiling and floor effects were 0% and 6% for Precaution, 0% and 10% for Routine Activities, and 1 % and 7% for Lifestyle, respectively. Both ceiling and floor effects were zero for the whole scale.

After that, first-order factor analysis was performed (Figure 1). Given that the AVE was lower than 0.5 for all three factors, convergent validity was not confirmed. In addition, due to AVE<MSV, divergent validity was not also present; therefore, second-order factor analysis was employed (16) (Figure 2). In the second-order factor analysis, the measurement model had a good fitness as indicated by x^2=262.365, df=82, P<0.001, RMSEA=0.062, PCFI=0.725, PNFI=0.703, IFI=0.930, and the CFI=0.929. After examining the model using first-order factor analysis, the three factors extracted as the general concept of COVID-19 self-care were analyzed using second-order factor analysis. The fit indices of the second-order factor analysis were then compared to those of the first-order model (Tables 3 and 4).

Table 1. Demographic characteristics of the participants

Variables		n	%
Gender	Male	192	33
	Female	390	67
Occupation	Employed	297	51
	Unemployed	285	49
Marital status	Married	357	61.3
	Single	225	38.7
Level of education	Elementary school	115	19.8
	High school	159	27.3
	College degree	308	52.9
Having a family member with a history of COVID-19	Yes	210	36.1
	No	372	63.9
Health status	Very good	145	24.9
	Good	271	46.6
	Average	119	20.4
	Bad	39	6.7
	Very bad	8	1.4
Comorbidity	Present	98	16.8
	Not present	484	83.2

Table 2. Exploratory factor analysis of the SCOVID

Factor	Items	h^2	Factor loading	% Variance	λ	Internal consistency
Prevention	12. Keep a distance of at least 1m from others outside the home.	0.483	0.657	16.24	2.423	α=0.798 Ω=0.812
	6. Avoid places where a distance of at least 1m between people is not kept.	0.484	0.600			
	5. Avoid touching your eyes, nose, or mouth by hand when outside the home, even when wearing gloves.	0.350	0.597			
	7. Disinfect shared surfaces and objects (such as handles, switches, keyboards, remote controls, and phones).	0.408	0.569			
	2. Ensure the hygiene of your home using chlorine- or alcohol-based disinfectants.	0.357	0.565			
	1. Wash your hands with water and soap or a hand sanitizer after performing activities putting you at risk of getting the virus (such as the use of public transportation and grocery shopping)	0.253	0.506			
	20. Ensure proper ventilation in rooms shared with other people (such as the workplace and home).	0.444	0.462			
	13. Wear disposable gloves in public places (such as public transportation and supermarkets) where there is a risk of getting the virus.	0.374	0.453			
Routine Activities	18. Maintain a regular sleep-wake cycle (such as going to bed and waking up at a certain hour every day).	0.546	0.770	8.91	1.342	α=0.721 Ω=0.728
	19. Try to have a daily routine.	0.524	0.688			
	10. Try to maintain a healthy and balanced diet according to your daily activities.	0.459	0.434			
	15. Try to stay in touch with people other than members of your household (such as friends, family members, and colleagues) by phone calls, video calls, or emails	0.243	0.314			
Healthy Lifestyle	9. Try to maintain your usual hobbies or start new ones (such as painting, gardening, and cooking).	0.524	0.686	7.16	1.075	α=0.711 Ω=0.716
	8. Maintain your physical activity (such as walking, running, cycling, and use of online training programs)	0.539	0.613			
	4. Do something to reduce stress (such as meditation, yoga, or listening to music).	0.327	0.493			

h^2: Communalities, λ: Eigenvalue, α: Cronbach's alpha, Ω: McDonald's omega

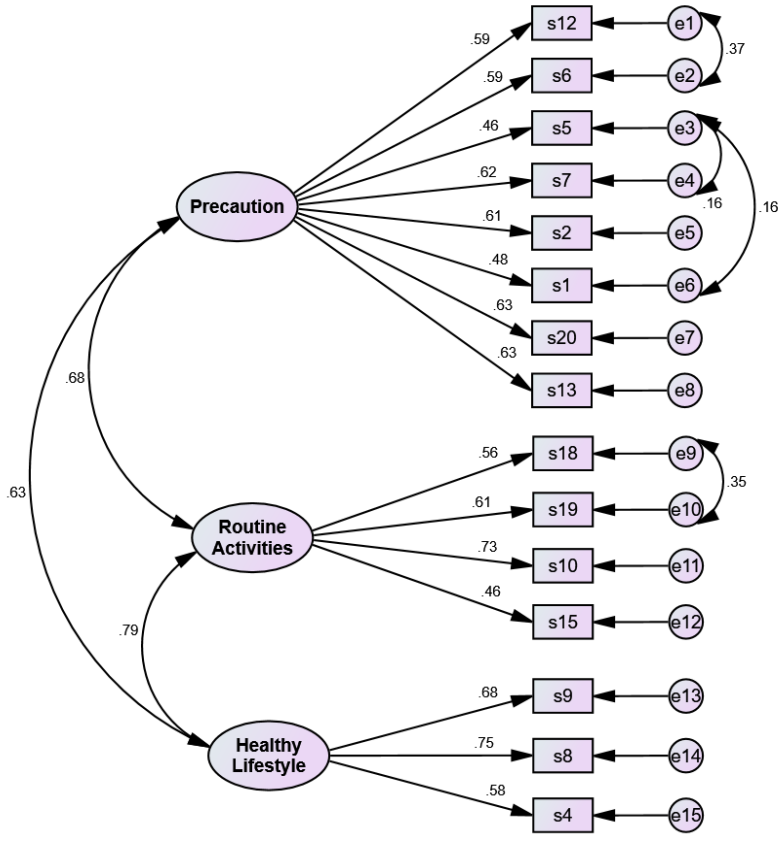

Figure 1. First-order factor analysis

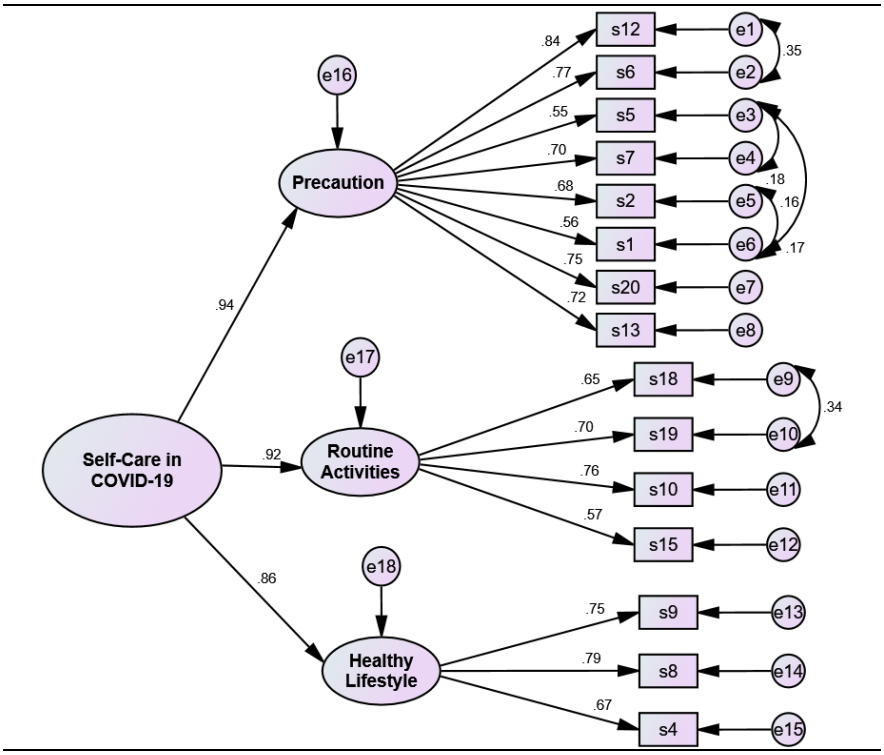

Figure 2. Second-order factor analysis

Table 3. Model fitness indices of the first and second-order CFA

Index CFA	X^2	df	P-value	CMIN/DF	RMSEA	PCFI	PNFI	IFI	CFI
First order	272.725	83	<0.001	3.286	0.063	0.731	0.709	0.926	0.925
Second order	262.365	82	<0.001	3.200	0.062	0.725	0.703	0.930	0.929

CFA: Confirmatory Factor Analysis, df: Degrees of freedom, CMIN/DF: Minimum Discrepancy Function by Degrees of Freedom divided, RMSEA: Root Mean Square Error of Approximation, PCFI: Parsimonious Comparative Fit Index, PNFI: Parsimonious Normed Fit Index, IFI: incremental fit index, CFI: Comparative of Fit Index

Table 4. Convergent and divergent validity and reliability of the SCOVID

Factors	CR	AVE	MSV	MaxR (H)	Ω	α
Precaution	0.799	0.335	0.458	0.806	0.812	0.798
Routine activities	0.685	0.358	0.619	0.710	0.728	0.721
Healthy Lifestyle	0.714	0.457	0.619	0.730	0.716	0.711

CR: Construct reliability, AVE: Average variance extracted, MSV: maximum shared squared variance, MaxR (H): Maximum reliability H, Ω: McDonald Omega; α: Cronbach's alpha

5. Discussion

This study aimed to examine the psychometric properties of the Persian version of the SCOVID Scale in the general population of Iran. According to the results, three factors of Precaution, Routine Activities, and Lifestyle explained one-third of the variance in COVID-19 self-care. Floor and ceiling effects were in a good range for the scale, indicating its content validity.

The first factor (Precaution) explained the highest percentage of variance in COVID-19 self-care and consisted of eight items about social distancing, disinfection of surfaces, not touching the face with hands, regular hand-washing, cleaning the house with disinfectants, and wearing gloves. The WHO considers education, controlling the transmission, prevention, and treatment of infected patients as critical steps in managing infectious diseases similar to COVID-19 (23). Proper ventilation has also a critical role in reducing the risk of infectious diseases, such as severe acute respiratory syndrome (24). The WHO has introduced guidelines to reduce viral loads, such as cleaning and disinfection of surfaces and waste using 0.1% sodium hypochlorite, 0.5% hydrogen peroxide, or 62% to 71% ethanol (25). However, public knowledge is still not adequate on this issue (26). Participants of the study by Ahmadizadeh et al (2019). did not have enough knowledge about disinfecting surfaces (22). Excessive and incorrect use of disinfectants can lead to health consequences, such as asthma and chronic obstructive pulmonary disease (27). Recent meta-analysis results showed that wearing face masks, especially N95 masks, can significantly protect healthcare personnel from infection. However,

wearing gloves and gowns did not reduce the risk of infection (28). A study result in the US showed that although most participants wore a mask during the COVID-19 pandemic, only one-third of them wore gloves (in high-risk situations), most of whom were older adults and women (29). It might result from the fact that the effectiveness of wearing gloves by the general population to prevent COVID-19 infection is unknown. Despite having no evidence to support the use of gloves, many people have decided to wear them because the media and administrations do not have a clear message about using gloves for the general population (30).

The second factor (Routine Activities) refers to maintaining a regular sleep-wake rhythm, diet, interaction with others, and stable daily planning. The highest factor loading in this factor belonged to the sleep-wake item. Lockdown during the COVID-19 pandemic has changed the lifestyle of many people, depriving them of social interactions, creativity, opportunities, and positive relationships (31). These restrictions can disturb people's chronobiological rhythms (32). Shigemura et al. believe that changes in family and daily activities, social isolation, and domiciliary confinement can lead to hopelessness, loneliness, insomnia, and anger (33). Sleep disorders and the prevalence of sleep problems during the COVID-19 pandemic have been confirmed in review studies (34, 35).

The third factor (Healthy lifestyle) refers to stress reduction, physical activity, and routine life entertainment. Studies conducted in different countries have shown that during the COVID-19 pandemic, one-third of the world population suffered from depression, anxiety, and psychological distress (36-38). In addition to quarantine, hearing or reading information about COVID-19 intensified this distress (39).

People's daily activities are disrupted during this period, and parents, especially mothers, face higher responsibilities (32, 40). Reduced physical activity due to home isolation in this period can increase a wide range of negative cardio-metabolic and mental effects (41). A meta-analysis study by Wahid et al. (2016) showed that physical activity was related to a 17% reduction in the risk of cardiovascular disease, a 23% reduction in the risk of death from cardiovascular disease, and a 26% reduction in type II diabetes (42). A study conducted by Slimani et al. (2020) on changes in physical activity and emotional status during home isolation showed that those who were physically active during this period had a better quality of life, physical health, mental health, and social interactions, compared to others (43). All three factors extracted for the Persian version of the SCOVID had internal consistency estimates of above 0.70, which is in the acceptable range. The whole scale had a Cronbach's alpha of 0.861, which is similar to that of the original version (0.860).

6. Conclusion

The Persian version of the SCOVID scale has good validity and reliability and can be used in future studies.

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Footnotes

Conflicts of Interest: There is no conflict of interest.
Authors' Contributions: Conception and design: NP and RGG; Data analysis and interpretation: HSN and AE; Collection and assembly of data: NP and MG; Final revision and grammar: NP and RGG. All authors read and approved the final manuscript.
Ethical Approval: All procedures involving human participants were performed per the Declaration of Helsinki in this study. All participants were fully informed about the purpose of the study, and then all participants signed informed consent before participating.
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Informed Consent: Informed consent was obtained from all participants.

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