

The Psychometric Assessment of the Chronic Disease Self-Efficacy Scale in Iranian Patients with Chronic Diseases

Hamid Sharif Nia¹, PhD; Marzieh Hatef¹, MS; Kelly A Allen², PhD; Vida Shafipour¹, PhD; Ravanbakhsh Esmaeili¹, PhD

¹Psychiatry and Behavioral Sciences Research Center, Addiction Institute, Mazandaran University of Medical Sciences, Sari, Iran;

²School of Education, University of Melbourne, Melbourne, Australia

Corresponding Author:

Vida Shafipour, PhD; Psychiatry and Behavioral Sciences Research Center, Addiction Institute, Department of Medical-Surgical Nursing, Nasibeh school of Nursing and Midwifery, Mazandaran University of Medical Sciences, Postal code: 48167-15793, Sari, Iran

Tel: +98 11 33367342-4; Fax: +98 11 33368915; Email: v.shafipour@mazums.ac.ir

Received: 25 September 2018 Revised: 30 October 2018 Accepted: 1 November 2018

ABSTRACT

Background: To provide better health care to chronic patients, the use of valid and reliable tools is necessary. This study aimed to assess the psychometric properties of the Persian version of the Chronic Disease Self-Efficacy Scale (CDSSES).

Methods: In the objective of the present methodological study 401 patients with chronic disease including renal and cardiac disease, diabetes and hypertension were selected by convenience sampling from three hospitals in Mazandaran province in Iran and filled out the CDSSES. The 33-item CDSSES has three dimensions. The face, content, construct, convergent and discriminant validities of the scale were assessed. Reliability was determined by internal consistency and construct reliability.

Results: Based on exploratory factor analysis, a five-factor solution was selected, explaining 55.03% of the total variance. By confirmatory factor analysis, the five-factor solution and the second-order latent factor model were supported. The convergent and discriminant validities of all the factors were acceptable. The reliability of CDSSES exceeded $\alpha > 0.7$.

Conclusion: The present study results showed that the five-factor construct of CDSSES had a suitable validity and reliability; thus, the Persian version of this scale can be used in assessing self-efficacy in chronic patients.

KEYWORDS: Chronic diseases, Psychometric methods, Reliability, Self-efficacy, Validity

Please cite this article as: Sharif Nia H, Hatef M, Allen KA, Shafipour V, Esmaeili R. The Psychometric Assessment of the Chronic Disease Self-Efficacy Scale in Iranian Patients with Chronic Diseases. *IJCBNM*. 2019;7(2):97-108.

INTRODUCTION

Chronic diseases can affect all people irrespective of their age, socioeconomic status or culture.¹ They can also be a primary cause for disability, dependence on others, job loss, increased risk of hospitalization, and increased mortality rates.¹ Some patients only experience minor discomfort as a result of their chronic condition, while others face major limitations to their daily activities.² These problems affect different aspects of the patients' life.³ Due to the possible long-term treatment, patients with chronic disease often require lifestyle change in order to cope with their disease and manage its complications. Countries throughout the world are expected to lose significant amounts of national income as a result of chronic diseases. The increased incidence of chronic diseases and epidemiological transition phenomenon in Iran would impose the country with the economic burden of chronic disease.¹ Public policy has a strong focus on chronic disease, emphasizing health system's redesign to enhance population-based prevention and chronic disease management.⁴

Patient self-efficacy (SE) is an essential component of the treatment and management of patients with chronic disease.⁵ SE is an important component of cognitive-social theory.⁶ It refers to an individual's confidence in his or her ability, motivation, or performance. People with high SE have been found to be more successful in controlling chronic disease and are more likely to actively participate in self-care.³

Many studies have examined the concept of SE using a variety of measures. For instance, some researchers^{3,7} used the 29-item Health Promotion Strategic Framework to assess SE, and two of them^{8,9} used the 17-item General SE Scale by Sherer. Both of these scales measure general SE in the general population rather than in patients. Both of these scales measure general SE in the general population rather than in patients. Moreover, the Chronic Disease Self-Efficacy Scale (CDSSES) was developed specifically for patients with chronic disease and assesses the

SE of chronic patients in different aspects and can exactly examine a wide range of chronic patients' behaviors. Therefore, there is a need to translate and validate a tool specifically designed to measure chronic disease SE.

Considering the fact that chronic disease accounts for nearly half of the global burden of diseases, with seven out of every ten deaths across the world expected to be caused by chronic disease by 2030¹⁰ and the valuable role SE plays in the management of chronic disease, specific and practical tools are needed to measure different dimensions of SE in chronic patients for improved patient care.

It is, therefore, necessary to assess SE in different communities and groups, including in patients with chronic disease, so that better health care can be provided to these groups using valid and reliable tools. CDSSES has three dimensions and each dimension has one or more subscales. The dimensions consist of measuring SE to self-manage behaviors, measuring general SE, and assessing the SE to achieve the outcomes. These dimensions can exactly examine a wide range of chronic patients' behaviors. Given that no studies have yet assessed the psychometric properties and factor construct of the CDSSES in Iran, the present study was conducted to carry out a psychometric assessment of the Persian version CDSSES in a sample of patients with chronic diseases.

MATERIALS AND METHODS

This methodological study was done from October 2016 to February 2017. Generally, there is no suggestion for the appropriate sample size when conducting a factor analysis (¹¹). According to the rule of thumb, the minimum sample size required for performing a factor analysis is 200 cases.¹² A total of 401 patients with chronic disease including renal and cardiac disease, diabetes and hypertension were selected by convenience sampling from three hospitals in Mazandaran province in Iran.

The study inclusion criteria required participants to be 18 years or older, demonstrate

an ability to understand the questionnaire's items, have a confirmed diagnosis of a chronic disease by a physician, and a have a minimum six-month history of a chronic disease (e.g. hypertension, diabetes and cardiac and renal diseases). Participants with cognitive and psychological disorders were excluded from the study due to the potential negative effect of these diseases on the response rate.¹³⁻¹⁵ Data were collected using a demographic questionnaire and the 33-item CDSSES.

The original version of CDSSES questionnaire was developed in 1996 by Lorig et al. in the US. To answer the CDSSES 33-items, participants had to choose a number from one to ten, where one indicated "not at all confident" and ten indicated "totally confident". The original CDSSES has three dimensions and each dimension has one or more subscales. The first dimension measures SE to self-manage behaviors and consists of the following subscales: 'Exercise regularly' (items 1-3), 'get information about disease' (item 4), 'obtain help from community, family, friends' (items 5-8) and 'communicate with physician' (items 9-11). The second dimension measures general SE and contains the single subscale of 'manage disease in general' (items 12-16). The third dimension assesses the SE to achieve the outcomes and consists of the following subscales: 'Do chores' (items 17-19), 'social/recreational activities' (items 20-21), 'manage symptoms' (items 22-26), 'manage shortness of breath' (item 27) and 'control/manage depression' (items 28-33). The score of each item is chosen by the patient, and if two numbers are chosen close together, the lower number is considered as the true score, and if the chosen numbers are too discrepant, no scores are assigned to that item. Higher scores indicate higher SE.¹³ For psychometric and translation of this questionnaire World Health Organization (WHO) protocol was used.

A. The Translation Process

For this step, the original version of the CDSSES, which is available for public use,

was used. The scale was translated using the forward-backward technique in accordance with the standard WHO protocol.¹⁶

a) First, two English language experts were invited to collaborate in the project, one of whom had knowledge of medical terms and SE expressions, while the other had no medical knowledge and did not know the relevant terminology.

b) Two independent Persian translations were assessed by a panel of experts, researchers, study collaborators and translators, who discussed the differences between the two translations and resolved any discrepancies between the two versions.

c) In the next step, two separate English language experts (in addition to the two translators) without prior acquaintance with the English version of the questionnaire and with no knowledge of the stages of the research, translated the Persian version back into English.

d) The two English translations were then assessed, modified and combined by the researchers in order to produce a single English version, which was then compared with the original English version.

The psychometric properties of the scale were assessed using the Face validity, Content validity, Construct validity, Convergent and Discriminant validity, and Reliability.¹⁷

B. Face Validity

1. Qualitative face validity

Ten patients undergoing chronic disease were invited to participate in the study. Their views on the appropriateness, difficulty, relevancy and ambiguity of the scale items were collected and any necessary modifications were made, based on their comments. The time needed for responding to the scale items was also estimated in this step.

2. Quantitative Face Validity

The same ten patients were asked to rate the importance of the scale items on a Likert scale from 1 (Not important) to 5 (Completely important). The score of the importance of

each item in the scale was then estimated using a special formula (importance score \times frequency). In this formula, frequency indicates the number of people who have given a score of 4 or 5 to the intended item and importance indicates a score of 4 or 5. Impact scores higher than 1.5 for each item were considered desirable.¹⁷

C. Content Validity

1. Qualitative Content Validity

Persian version of the CDESES was distributed among 15 specialists (including nursing, internal and nephrology specialists who are members of the faculty of Mazandaran University of Medical Sciences); they were asked to offer their feedback after a qualitative assessment of the questionnaire based on the criteria of observing the rules of grammar, the use of appropriate terms, the proper placement of items and the proper method of scoring. Also, cultural convergence was assessed by experts.¹⁷

2. Quantitative Content Validity

2.a: Content Validity Ratio (CVR)

The CVR was used to examine whether or not an item was necessary. The scale was given to the same 15 specialists who were asked to rate each item based on a three-point scale (1: not necessary; 2: helpful but not necessary; 3: necessary). Based on Lawshe's table, if the item was greater than 0.49, the related item was necessary.¹⁸

2.b: Content Validity Index (CVI)

CVI was used for calculating the relevancy of the items with the following options: Relevancy: 1: Not relevant at all; 2: Relevant to some extent; 3: Reasonably or moderately relevant; and 4: Completely relevant. Any item scoring greater than 0.79 remained in the scale. If the CVI varied from 0.70 to 0.79, the related statement was considered to be controversial, thus requiring revision and modification; if it was less than 0.70, the statement was unacceptable and had to be removed.¹⁹

D. Construct Validity

Construct validity was assessed using exploratory factor analysis.²⁰ The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's Test were applied. A KMO value of 0.7 to 0.8 was considered good and a value of 0.8 to 0.9 was considered great.¹⁸ After the invisible factors were extracted, the Maximum likelihood (ML) estimation and the Promax rotation were used along with a scree plot using SPSS-AMOS 24. The number of factors was determined based on Horn's Parallel Analysis²¹ by JASP 0.9.0.1. The presence of one item in the factor was determined as 0.3 based on the formula of $CV=5.152/\sqrt{(n-2)}$.²²

According to the three indicator rule, at least three items must exist for each factor in an Exploratory Factor Analysis (EFA).²³ The extracted factors were examined using a Confirmatory Factor Analysis (CFA) and the most common goodness of fit indices of the model were based on the accepted threshold. The Chi-Square Goodness-of-Fit Index, the Root Mean Square Error of Approximation (RMSEA), the Parsimony Comparative Fit Index (PCFI), the Adjusted Goodness of Fit Index (AGFI), and the ratio of the Chi-square to the degrees of freedom were examined (Table 1).²⁴ Next, the second-order CFA represented the more general concepts at the secondary and upper levels.¹⁹ It is assumed that the extracted factors in the first stage are the reflections of another level of conception by their own and can show a more general concept on secondary and higher levels.²⁵

E. Convergent and Discriminant Validity

The convergent and discriminant validities of the CDESES were assessed by Fornell & Larcker approach measuring the Average Variance Extracted (AVE), the Maximum Shared Squared Variance (MSV), and the Average Shared Square Variance (ASV). For establishing the convergent validity, the AVE had to exceed 0.5, and for the discriminant validity, the MSV and ASV had to be less than the AVE.²⁶

Table 1: Rotated Factor Loadings of Exploratory Factor Analysis for the CDSSES

Factors	Items	Loading	h ²	%of Variance	Eigenvalue
1 Control Emotion	Q32: How confident are you that you can do something to make yourself feel better when you are feeling discouraged?	0.787	0.755	13.62	3.65
	Q33: How confident are you that you can do something to make yourself feel better when you feel sad or down in the dumps?	0.751	0.741		
	Q29: How confident are you that you can keep from feeling sad or down in the dumps?	0.746	0.687		
	Q30: How confident are you that you can keep yourself from feeling lonely?	0.733	0.683		
	Q28: How confident are you that you can keep from getting discouraged when nothing you do seems to make any difference?	0.633	0.579		
	Q31: How confident are you that you can do something to make yourself feel better when you are feeling lonely?	0.655	0.701		
2 Perform Daily Activities	Q19: How confident are you that you can get your shopping done despite your health problems?	0.751	0.654	11.18	3.13
	Q18: How confident are you that you can get your errands done despite your health problems?	0.745	0.715		
	Q17: How confident are you that you can complete your household chores, such as vacuuming and yard work, despite your health problems?	0.705	0.636		
	Q21: How confident are you that you can continue to do the things you like to do with friends and family (such as social visits and recreation)?	0.482	0.600		
	Q20: How confident are you that you can continue to do your hobbies and recreation?	0.429	0.561		
3 Manage the Problems Associated with Disease	Q24: How confident are you that you can keep the physical discomfort or pain of your disease from interfering with the things you want to do?	0.774	0.854	11.01	3.08
	Q25: How confident are you that you can keep any other symptoms or health problems you have from interfering with the things you want to do?	0.773	0.881		
	Q26: How confident are you that you can control any symptoms or health problems you have so that they do not interfere with the things you want to do?	0.746	0.860		
	Q12: Having an illness often means doing different tasks and activities to manage your condition. How confident are you that you can do all the things necessary to manage your condition on a regular basis?	0.555	0.518		
	Q23: How confident are you that you can keep the fatigue caused by your disease from interfering with the things you want to do?	0.475	0.574		

4 Control Behavior	Q3: How confident are you that you can exercise without making symptoms worse?	0.843	0.756	10.04	2.81
	Q2: How confident are you that you can do aerobic exercise such as walking, swimming, or bicycling three to four times each week?	0.811	0.764		
	Q1: How confident are you that you can do gentle exercises for muscle strength and flexibility three to four times per week (range of motion, using weights, etc.)?	0.739	0.666		
	Q14: How confident are you that you can do the different tasks and activities needed to manage your health condition so as to reduce your need to see a doctor?	0.425	0.503		
	Q22: How confident are you that you can reduce your physical discomfort or pain?	0.363	0.503		
5 Communicate with a Physician	Q10: How confident are you that you can discuss openly with your doctor any personal problems that may be related to your illness?	0.916	0.880	9.72	2.74
	Q9: How confident are you that you can ask your doctor things about your illness that concerns you?	0.888	0.865		
	Q11: How confident are you that you can get work out differences with your doctor when they arise?	0.747	0.662		

h^2 : Communalities

F. Reliability

To assess the internal consistency (n=200) of the CDSSES, coefficients of Cronbach's alpha (α), McDonald's Omega (Ω) and Average Inter-item Correlation (AIC) were estimated.²⁷ Coefficient's Ω and α values greater than 0.7 were considered acceptable.²⁸ The Construct reliability (CR, n=200),²⁹ which replaces Cronbach's alpha coefficient in structural equation modeling, was then evaluated, and CR greater than 0.7 were considered acceptable.¹⁹ Also, AIC 0.2 to 0.4 was considered as a good internal consistency.³⁰

To evaluate the normal distribution of the data, the outlier and missing data were assessed separately. Multivariate outliers were noticed using the Mahalanobis d-squared ($P < 0.001$), and the violation of multivariate kurtosis was assessed using the Mardia coefficient, which had to exceed 8.³¹ The amount of missing data was assessed through a multiple imputation process.

This research was approved by the Ethics Committee of Mazandaran University of Medical Sciences under the Ethics Code IR.MAZUMS.REC.95.2612. The patients were briefed on the general objectives of the

research; then, they submitted their informed consent forms before participating in the study.

RESULTS

The patients were 18 to 80 years old and had a mean age of 57.5 (SD=11.5) years. A total of 51.6% were men, 47.9% women, 6% single, 83.8% married, and 9.7% were divorced or widowed. The type of chronic disease included 17.2% diabetes, 18% hypertension, 46% end stage renal disease, and 18.7% chronic heart disease. The average of BMI was 28.5. A total of 22.6% of them had a history of cigarette smoking.

A. Translation Process

Two independent Persian translations of the CDSSES were constructed. This allowed for the preparation of a single Persian version of the scale, while taking all the possible word choices and terminologies into account. Two separate English language experts translated the Persian version back into English. The two English translations were compared with the original English version.

B. Face Validity

The quantitative face validity of all the items based on the views of ten patients with chronic disease was considered favorable. The impact score was more than 1.5.

C. Content Validity

The qualitative content validity was also confirmed after the tool’s modification by the experts and once the necessary language and grammar corrections were made. Based on the results of the assessment of the quantitative content validity (the CVI and the CVR), no items were eliminated from the CDSSES.

D. Construct Validity

According to Mardia coefficient and Mahalanobis d-squared, the items had a suitable multivariate distribution. KMO and Bartlett’s test were 0.891 and 378 (P<0.001), respectively. Five factors were extracted from the EFA based on Parallel Analysis and scree plot (Figure 1) named (*control emotions,*

perform daily activities, manage the problems associated with disease, control behaviour, and communicate with a physician) explained 55.03% of the variance (Table 2). The results of the first- order CFA indicated a good fit [χ^2 (209, N=401)=520.66, PCFI=0.951, PNFI=0.921, CMIN/DF=2.491, AGFI=0.872 and RMSEA=0.061. According to the final construct model, the measurement errors in some of the items correlated with each other, including items 21st and 20th (e10, e11), 18th and 17th (e8, e9), 31th and 30th (e4, e6), 29th and 28th (e3, e5), and 32th and 33th (e1, e2), as shown in Figure 2.

Next, a separate evaluation of the factors of the CDSSES and the correlation between the constructs was performed. The second-order factor analysis was performed to examine whether or not all the factors fitted the general concept of “chronic disease self-efficacy” (Figure 3). Table 2 presents the indices of fit for the second-order CFA compared to the first-order model.

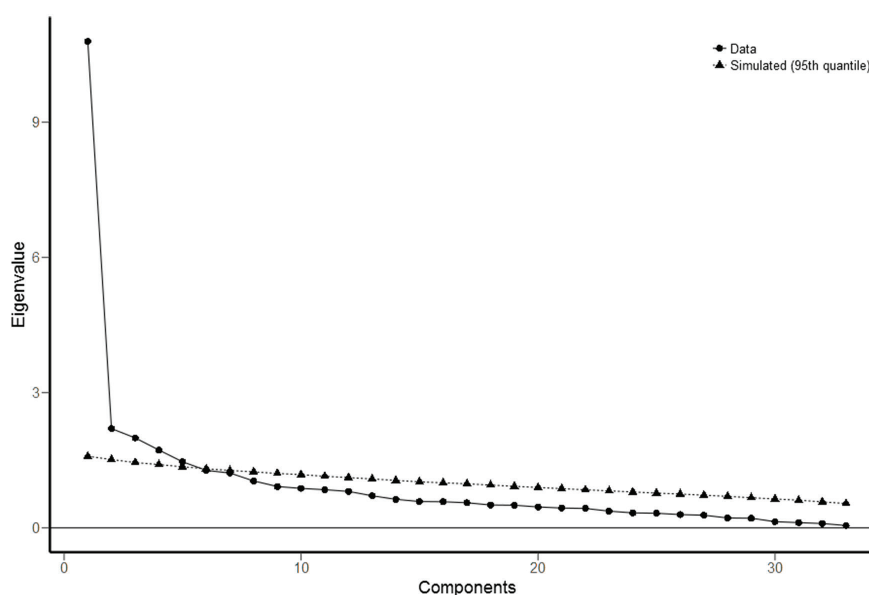


Figure 1: Scree Plot of Chronic Disease Self-Efficacy Scale (95th quantile)

Table2: Fit indices of the first and second order confirmatory factor analysis of the CDSSES

CFA	χ^2	df	P value	CMIN/DF	RMSEA	PCFI	PNFI	AGFI	IFI	CFI
First order after structure modification	619.76	215	<0.001	2.885	0.069	0.796	0.770	0.848	0.937	0.936
Second order after structure modification	627.95	220	<0.001	2.854	0.068	0.814	0.787	0.848	0.936	0.936

Fitness indexes: PNFI, PCFI, AGFI (>0.5), CFI, IFI (>0.9), RMSEA (>0.08), CMIN/DF (>3 good, >5 acceptable)

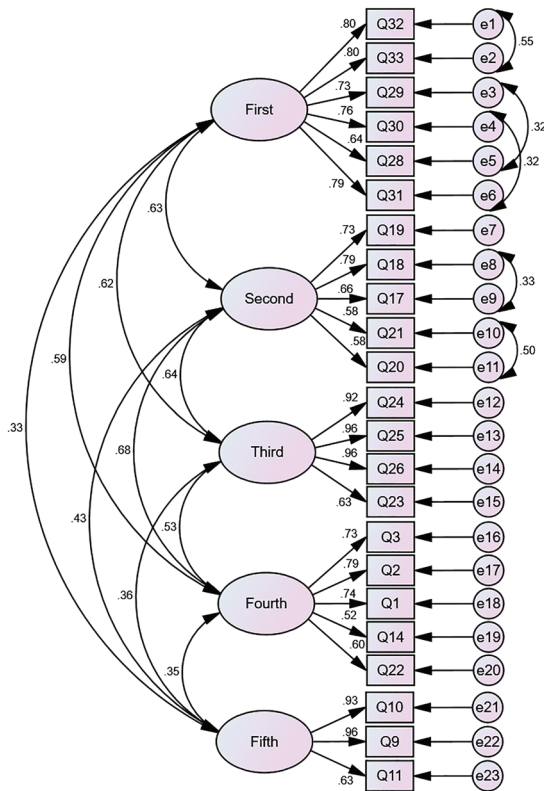


Figure 2: CDESES 5- factor model with standardized path coefficients. All coefficients are significant at $P < 0.001$.

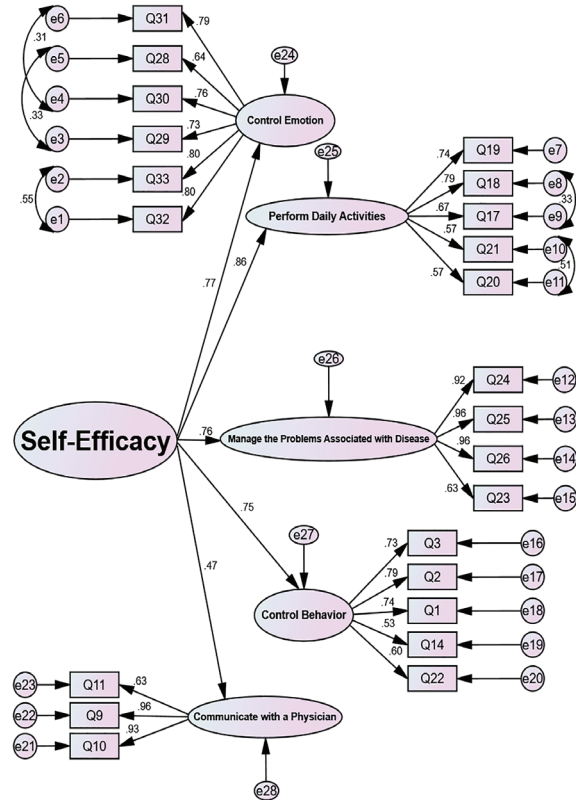


Figure 3: Structure of CDESES: Modified model of second-order confirmation factor analysis

Table 3: Convergent, Divergent Validity (Fornell Larcker Criterion) and Reliability Results

Factors	AVE ^a	MSV ^b	ASV ^c	CR ^d	Ω^e	α (CI95%)	AIC ^f
Emotion Control	0.575	0.466	0.337	0.890	0.901	0.900 (0.884 to 0.914)	0.600
Performing Daily Activities	0.596	0.446	0.374	0.829	0.763	0.756 (0.715 to 0.793)	0.441
Management of Problems Associated with Disease	0.772	0.397	0.324	0.930	0.885	0.866 (0.845 to 0.886)	0.546
Controlling Own Behaviors	0.515	0.446	0.395	0.779	0.809	0.806 (0.775 to 0.835)	0.450
Communicating with Physician	0.727	0.181	0.148	0.886	0.886	0.860 (0.834 to 0.882)	0.695

^aAverage Variance Extracted; ^bMaximum Shared squared Variance; ^cAverage Shared squared Variance; ^dConstruct Reliability; ^eMcDonald's Omega Coefficient; α : Cronbach Alpha; ^fAverage Inter-item Correlation

E. Convergent and Discriminant Validity

According to Table 3, AVE was greater than 0.5 for all the factors. The AVE of each factor was also greater than the ASV. According to these results, the CDESES had a good convergent and discriminant validity.

F. Reliability

Coefficients of Cronbach's alpha, McDonald's Omega, and CR revealed a good reliability (>0.7). Also, AIC of all factors were acceptable (Table 3).

DISCUSSION

This study was conducted to determine the validity and reliability of the 33-item CDESES in patients with chronic disease. To confirm the adequacy of sampling, and given the sample size equation for factor construct models,³² assessing the factor construct of the CDESES based on the construct and final model given the effect size of 0.12, the expected statistical power of 0.8, the total of five latent variables, and the 23 observable variables extracted, the

minimum sample size required was estimated 201, which reveals the adequacy of the sample size used for this confirmatory factor analysis.

The findings of the current study show that the CDESES is a five-factor scale (self-efficacy to control emotion, self-efficacy to perform daily activities, self-efficacy to manage the problems associated with disease, self-efficacy to control behaviour and self-efficacy to communicate with a physician). One researcher used the CDESES to assess the patients with arthritis, diabetes and hypertension and found ten factors for the scale (exercise regularly, get information about disease, obtain help from community, family, friends, communicate with physician, manage disease in general, do chores, social/recreational activities, manage symptoms, manage shortness of breath and control/manage depression), which collectively explained 72.5% of the variance.¹⁵ Also, another research found a uni-dimensional construct that explained 89.02% variance³³ and one researcher extracted three factors (self-efficacy to perform self-management behaviors, general self-efficacy and self-efficacy to achieve outcomes) from the 33-item version of the scale.¹³ The author in one article has argued that factor extraction is considered to be good when the variance is between 50 to 60 percent.³³

It is worth noting that the concept of SE may have diverse meanings in different societies, especially in chronic cardiac, renal, diabetic and hypertensive patients, who seem to form a unique group of patients. Based on the reported indices, the model had a good fit and most of the factor loads exceeded 0.5, which indicates the minimum acceptability of the factor loading. According to a review of the literature, all of the studies which had used the CDESES previously had merely performed an EFA and the present study is, therefore, the first to perform a CFA. As a result, comparing these findings with the results of other studies regarding the CFA of the scale was not possible.

In current study, the first factor extracted

was “self-efficacy to control emotion”. A person with a strong SE seems to believe that he/she can deal with his/her life events and problems effectively. Self-efficacy can be an effective factor in motivation and coping behavior and also a protective factor against negative mood.³⁴ This factor is almost the same as the last factor extracted by two articles. (i.e. manage depression). A review of studies suggests that the difference between this and the factors extracted in other studies can be due to the diverse statistical population examined.^{13, 15}

In the current study, the second factor identified was “self-efficacy to perform daily activities”. Bandura believes that SE and abilities can be enhanced in people by creating a context that is conducive to their success in obtaining knowledge and new skills. According to his theory, the individual’s perception of his or her abilities leads to the use of self-care behaviors.³⁴ This factor is the same as the sixth factor extracted by two researchers (i.e. general self-efficacy).^{13, 15}

The third factor was “self-efficacy to manage the problems associated with the disease”. Since SE affects the individual’s motivation and forces them to persist in their behavior, this factor is crucial to the treatment and management of the symptoms associated with chronic disease.³⁵ Notably, people with a high perceived self-efficacy are more successful in their self-care activities and ability to manage the problems associated with their disease.³⁶ One researcher also extracted a similar factor (i.e. manage symptoms).

The fourth factor was “self-efficacy to control behaviour”. Since SE is a part of the people’s basic life skills, it is considered an important prerequisite, such that increased SE has been associated with behavior change, the acceptance of treatment and consequently improved health.³⁷ One scientist argued that SE which is used to perform self-management behaviors (the first factor extracted in their study) contributes significantly to the overall SE in patients with chronic disease.¹³

The last factor extracted was “self-efficacy

to communicate with a physician". Patients with higher levels of SE are capable of better communication with the medical personnel, especially physicians. Medical staff has a sensitive role in the rehabilitation of chronic patients and can help increase the patients' ability to perform daily activities and reduce their social, psychological and financial problems.³⁴

According to the final construct of the CDSSES, the measurement errors in some of the items correlated with each other. Measurement error can occur when the items have not been properly identified or directly measured.³⁸ It can also occur due to the similarity in the meaning of the two separate items.³⁹ Also the measurement errors could happen because participants made the same type of mistake or because their answers were influenced by the same response set at both times.⁴⁰ The word constructs of the items that correlated in the present study were similar and they may have implied the same meaning for the participants; as a result, there was a significant correlation between their measurement errors.

All the factors, except for factors two and four, had a good convergent validity. The discriminant validity of all the factors was also confirmed. One scientist argued that convergent validity is established when the scale items are closely similar to each other and share much of the variance and also when the scale items or the latent variables extracted are completely separate from one another; in other words, convergent validity cannot be established when the latent variables are not adequately explained by the extracted items, and the items are not sufficiently correlated.³³ This scale also had an acceptable reliability, and the high Cronbach's alpha coefficient obtained indicated the good internal consistency of the scale and the correlation between its items. Previous studies have also confirmed the reliability of this scale with Cronbach's alpha coefficients ranging from 0.77 to 0.89.^{14, 15}

This study had a comprehensive analysis;

however, it had some limitations, including: 1) The self-reporting style of assessing the patients, which may have led to errors; 2) The use of exploratory and confirmatory factor analyses on four different types of chronic patients, which may slightly limit the generalizability of the results (further studies are recommended to investigate other groups of chronic patients, such as those with arthritis and chronic pulmonary obstructive diseases); and 3) The lack of other scales for examining SE on chronic patients with which to compare the findings (to establish the scale's concurrent validity).

CONCLUSION

Although the CDSSES has a five-factor construct, which is different from that of the original version developed in 1996 by Lorig et al. in the US it has a valid and reliable construct and can be used to assess SE in Iranian patients with chronic disease. The results of the EFA of the Persian version of the CDSSES in patients with chronic disease confirmed five individual factors. The five-factor construct of this scale has a favorable validity and reliability. Having a valid and reliable tool is the first and most important stage of designing studies for assessing SE in people with chronic diseases, especially those with chronic cardiac and renal diseases, diabetes, and hypertension.

ACKNOWLEDGEMENT

The author would like to thank all the participating patients and also those who contributed and conducted this study. This project was supported by the Psychiatric Research Center of Mazandaran University of Medical Sciences (coded 2612).

Conflict of Interest: None declared.

REFERENCES

- 1 Joachim G, Acorn S. Living with chronic illness: the interface of stigma

- and normalization. *Canadian Journal of Nursing Research*. 2016;32:37-48.
- 2 Peng YS, Chiang CK, Hung KY, et al. Are both psychological and physical dimensions in health-related quality of life associated with mortality in hemodialysis patients: a 7-year Taiwan cohort study. *Blood Purification*. 2010;30:98-105.
 - 3 Moattari M, Ebrahimi M, Sharifi N, Rouzbeh J. The effect of empowerment on the self-efficacy, quality of life and clinical and laboratory indicators of patients treated with hemodialysis: a randomized controlled trial. *Health and Quality of Life Outcomes*. 2012;10:115.
 - 4 Miles A, Loughlin M, Polychronis A. Evidence-based healthcare, clinical knowledge and the rise of personalised medicine. *Journal of Evaluation in Clinical Practice*. 2008;14:621-49.
 - 5 Cowen PS, Moorhead S. *Current issues in nursing*. 8th ed. USA: Mosby Elsevier; 2011.
 - 6 Kauric-Klein Z, Peters RM, Yarandi HN. Self-Efficacy and Blood Pressure Self-Care Behaviors in Patients on Chronic Hemodialysis. *Western Journal of Nursing Research*. 2017;39:886-905.
 - 7 Yuan C, Qian H, Wang J, et al. Factorial Structure of a Scale: Strategies Used by People to Promote Health—Chinese Version. *Cancer Nursing*. 2015;38:E13-20.
 - 8 De Caroli ME, Sagone E. Generalized self-efficacy and well-being in adolescents with high vs. low scholastic self-efficacy. *Procedia-Social and Behavioral Sciences*. 2014;141:867-74.
 - 9 Moradmand M, Khanbani M. Efficacy of written emotional disclosure on self-efficacy and affective control in student with anxiety. *Journal of Applied Psychology*. 2016;10:21-37. [In Persian]
 - 10 Kellar SP, Kelvin EA. *Munro's Statistical Methods for Health Care Research*. 6th ed. Philadelphia: Lippincott Williams & Wilkins; 2012.
 - 11 Mundfrom DJ, Shaw DG, Ke TL. Minimum sample size recommendations for conducting factor analyses. *International Journal of Testing*. 2005;5:159-68.
 - 12 Soleimani MA, Pahlevan Sharif S, Allen KA. Psychometric Properties of the Persian Version of Spiritual Well-Being Scale in Patients with Acute Myocardial Infarction. *Journal of Religion and Health*. 2016;56:1981-97.
 - 13 Lorig K, Stewart A, Ritter P, González V. *Outcome measures for health education and other health care interventions*. USA: Sage Publications; 1996.
 - 14 Chow SK, Wong FK. The reliability and validity of the Chinese version of the Short-form Chronic Disease Self-Efficacy Scales for older adults. *Journal of Clinical Nursing*. 2014;23:1095-104.
 - 15 Kim CJ, Chae SM, Yoo H. Psychometric Testing of the Chronic Disease Self-Efficacy Scale—Korean Version (CDSSES-K). *Journal of Transcultural Nursing*. 2012;23:173-80.
 - 16 World Health Organization. *Process of translation and adaptation of instruments*. Geneva: World Health Organization. [cited 21 March 2018] Available from: https://www.who.int/substance_abuse/research_tools/translation/en/
 - 17 Polit DF, Yang FM. *Measurement and the Measurement of Change: A Primer for the Health Professions*. Philadelphia: Wolters Kluwer; 2016.
 - 18 Sharif Nia H, Pahlevan Sharif S, Goudarzian AH, et al. An evaluation of psychometric properties of the Templer's Death Anxiety Scale-Extended among a sample of Iranian chemical warfare veterans. *Hayat*. 2016;22:229-44. [In Persian]
 - 19 Sharif Nia H, Shafipour V, Allen KA, et al. A Second-Order Confirmatory Factor Analysis of the Moral Distress Scale-Revised for Nurses. *Nursing Ethics*. 2017. [A head of print].
 - 20 Heiwe S, Jacobson SH. Exercise training in adults with CKD: a systematic review and meta-analysis. *American Journal of Kidney Diseases*. 2014;64:383-93.

- 21 Courtney MGR. Determining the number of factors to retain in EFA: Using the SPSS R-Menu v2.0 to make more judicious estimations. *Practical Assessment, Research & Evaluation*. 2013;18(8).
- 22 Norman GR, Streiner DL. *Biostatistics: The Bare Essentials*. New York (USA): B.C. Decker; 2008.
- 23 Munro BH. *Statistical methods for health care research*. Philadelphia: Lippincott Williams & Wilkins; 2005.
- 24 Schreiber JB, Nora A, Stage FK, et al. Reporting structural equation modeling and confirmatory factor analysis results: A review. *The Journal of Educational Research*. 2006;99:323-38.
- 25 Gatignon H. *Statistical Analysis of Management Data*. 3rd ed. New York: Springer; 2014.
- 26 Fornell C, Larcker DF. Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*. 1981;18:39-50.
- 27 Javali SB, Gudaganavar NV, Raj SM. Effect of varying sample size in estimation of coefficients of internal consistency. *Webmed Central Biostatistics*. 2011;2:WMC001572.
- 28 Mayers A. *Introduction to Statistics and SPSS in Psychology*. UK: Pearson Education; 2013.
- 29 Kaysen GA, Larive B, Painter P, et al. Baseline physical performance, health, and functioning of participants in the Frequent Hemodialysis Network (FHN) trial. *American Journal of Kidney Diseases*. 2011;57:101-12.
- 30 Cox T, Ferguson E. Measurement of the subjective work environment. *Work & Stress*. 1994;8:98-109.
- 31 Vinzi VE, Chin WW, Henseler J, Wang H. *Handbook of partial least squares: Concepts, methods and applications*. Berlin (Germany): Springer; 2010.
- 32 Nunnally JC, Bernstein IH. *The assessment of reliability, Psychometric theory*. 3rd ed. New York: McGraw-Hill; 1994.
- 33 Hair JF Jr, Anderson RE, Babin BJ, Black WC. *Multivariate data analysis: A global perspective*. 7th ed. New Jersey: Upper Saddle River, Pearson Education; 2010.
- 34 Craig A, Wijesuriya N, Tran Y. The Influence of Self-Efficacy on Mood States in People with Spinal Cord Injury. *ISRN Rehabilitation*. 2013;2013:1-6.
- 35 W Wu MS, Wu IW, Shih CP, Hsu KH. Establishing a platform for battling end-stage renal disease and continuing quality improvement in dialysis therapy in Taiwan-Taiwan Renal Registry Data System (TWRDS). *Acta Nephrologica*. 2011;25:148-53.
- 36 Tsay SL, Healstead M. Self-care self-efficacy, depression, and quality of life among patients receiving hemodialysis in Taiwan. *International Journal of Nursing Studies*. 2002;39:245-51.
- 37 Hojjati H, Sharif Nia H, Taheri N. *Statistics and research methodology in nursing and medical sciences*. Tehran: Salemi, Jameenrgar; 2010. [In Persian].
- 38 Cicirelli VG. Personality and demographic factors in older adults' fear of death. *The Gerontologist*. 1999;39:569-79.
- 39 Harrington D. *Confirmatory factor analysis*. UK: Oxford University Press; 2009.
- 40 Bandalos DL. *Measurement Theory and Applications for the Social Sciences*. USA: Guilford Publications; 2018.