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RESEARCH ARTICLE



## Translation and validation of the Persian version of the Stroke Self-Efficacy Questionnaire in stroke survivors

Alia Saberi<sup>a</sup>, Sajjad Saadat<sup>b</sup>, Fatemeh Dadar<sup>c</sup>, Mozaffar Hosseini-zhad<sup>a</sup>, Kasra Sarlak<sup>c</sup>, Samaneh Ghorbani Shirkouhi<sup>d</sup>, Nasim Athari<sup>c</sup> and Nima Broomand Lomer<sup>c</sup>

<sup>a</sup>Department of Neurology, Faculty of Medicine, Poursina Hospital, Guilan University of Medical Sciences, Rasht, Iran; <sup>b</sup>Department of Neurology, Faculty of Medicine, Neuroscience Research Center, Poursina Hospital, Guilan University of Medical Sciences, Rasht, Iran; <sup>c</sup>Faculty of Medicine, Guilan University of Medical Sciences, Rasht, Iran; <sup>d</sup>Student Research Committee, School of Medicine, Shahroud University of Medical Sciences, Shahroud, Iran

### ABSTRACT

**Background:** The Stroke Self-Efficacy Questionnaire (SSEQ) is a self-report scale that measures stroke survivors' self-efficacy and covers specific domains of functioning after stroke.

**Objectives:** We aimed to determine the validity and reliability of the Persian version of the SSEQ.

**Methods:** This descriptive cross-sectional study included 124 stroke patients in the sub-acute phase (between 2 weeks and 3 months of stroke onset). The original SSEQ was translated to Persian and back-translated to English. Demographic, neurologic examination, 'Persian Stroke Self-Efficacy Questionnaire (SSEQ-P)', and 'General Self-Efficacy Scale' (GSE-10) data were collected. The reliability of the questionnaire was evaluated by test-retest assessment among 30 people with stroke at an interval of two weeks. Factor analysis was used to assess the validity of SSEQ-P. Cronbach's alpha assessed internal consistency in all participants. Statistical analysis was performed by SPSS software version 23 and SmartPLS version 3.

**Results:** In this study, the mean of SSEQ scores was  $87.99 \pm 37.09$ . Content Validity Ratio (CVR) and Content Validity Index (CVI) were favorable. Convergent validity of the questionnaire was reported ( $r=0.669$ ) using GSE. Factor loadings of items in SSEQ ranged from 0.41 to 0.92. Validity indices (AVE = 0.75, SRMR = 0.07) showed that the single-factor model of the present study owns a favorable fit. Test-retest reliability and Cronbach's alpha values of SSEQ in the present study were calculated at 0.80 and 0.97, respectively.

**Conclusions:** The Persian version of the SSEQ depicted acceptable reliability and validity and can be utilized to evaluate the self-efficacy of patients with stroke.

### HIGHLIGHTS

- Stroke Self-Efficacy Questionnaire (SSEQ) is a self-report scale that measures stroke survivors' self-efficacy.
- The Persian version of the SSEQ demonstrated acceptable reliability and validity and can be used in stroke patients.

### ARTICLE HISTORY

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### KEYWORDS

Stroke; Stroke Self-Efficacy Questionnaire; validity; reliability; rehabilitation

## 1. Introduction

Stroke is an acute localized impairment in the functioning of the brain, retina, or spinal cord, which persists for more than 24 h or any duration if computed tomography (CT), magnetic resonance imaging (MRI), or autopsy reveals a focal infarction or hemorrhage that is pertinent to the symptoms [1]. In 2019, stroke, as the second-leading cause of mortality and the third-leading cause of combination of death and disability, was estimated to have an incidence of 12.2 million cases, a prevalence of 101 million cases, and a mortality of 6.55 million deaths globally [2]. In Iran,

a total of 963,512 prevalent cases, 102,778 incident cases, and 40,912 deaths due to stroke were reported in 2019 compared to 21,698 stroke deaths and 48,274 incident cases in 1990, indicating increased numbers of incident cases and deaths over 30 years. Fortunately, the age-standardized incidence rate (ASIR) and age-standardized death rate (ASDR) decreased meanwhile, both nationally and sub-nationally [3]. Stroke imposes a significant socioeconomic burden. The American Heart Association (AHA) reports that the direct medical expenses associated with stroke in the United States during 2018–2019 amounted to ~36.5 billion dollars [4]. The current options for intervention

and rehabilitation of stroke patients remain limited. However, recent advancements in the use of intravenous and intrathecal delivery of stem cells have shown promising therapeutic benefits for individuals experiencing cognitive and neurological impairments as a result of stroke [5].

Stroke survivors are more likely to exhibit persistent deficits in perceptual, cognitive, psychosocial, depression, and physical domains [6]. Self-efficacy, used in the management of post-stroke disability, is 'a belief of the individual in his/her ability to produce a certain level of performance on events that would influence or affect his/her life' [7,8]. Self-efficacy influences people's motivation, mood, and thoughts concerning their health-related behaviors by affecting their willingness to achieve their health-related milestones [9]. Patients' ability to cope with the issues and how to face them is related to self-efficacy, so stroke survivors with high self-efficacy are more likely to overcome depression compared to patients with low self-efficacy [10]. For example, one of the challenges that stroke patients may face in terms of self-efficacy is urinary frequency or retention, depending on the location of the injury. Various rehabilitation and management strategies, such as medication, behavioral therapy, and detrusor stimulator implantation, can be utilized to address these urinary concerns and enhance the stroke patient's quality of life [11].

Reliable evaluation of self-efficacy is pivotal in the rehabilitation process in stroke survivors [12]. The Stroke Self-Efficacy Questionnaire (SSEQ), developed by Jones et al. in 2008, is a stroke-specific measure designed to assess the self-efficacy of stroke survivors in performing daily functional activities and self-management. SSEQ demonstrated a high level of internal consistency, as evidenced by a Cronbach's  $\alpha$  value of 0.90. Furthermore, validation testing conducted on a sample of 57 stroke survivors, who were two weeks post-stroke, revealed that the SSEQ exhibited strong criterion validity and could distinguish between participants who could walk with or without assistance from others [13]. SSEQ has been translated and culturally adapted to different languages, including Turkish ( $\alpha=0.93$ ) [14], Chinese ( $\alpha=0.92$ ) [15], Danish ( $\alpha=0.80$ ) [16], and Portuguese ( $\alpha=0.82$ ) [17]. Since the psychometrics of a measure must be evaluated in every culture and language, we aimed to translate and validate the Persian version of the SSEQ separately.

## 2. Materials and methods

The authors have granted permission from the original developers of SSEQ (Jones F et al.) to translate and validate the questionnaire from English to Persian [13]. This

study was approved by the Medical Ethics Committee of Guilan University of Medical Sciences, Rasht, Iran (Registration Number: IR.GUMS.REC.1399.608) and was performed in accordance with the principles stated in the Declaration of Helsinki (2013) [18]. Informed consent was obtained from all participants, and participation was voluntary and with the preservation of anonymity.

### 2.1. Design

This descriptive cross-sectional study was conducted concordant with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist [19]. Persian version of the stroke self-efficacy questionnaire (SSEQ-P) translation and validation process was conducted in five stages: Initial Translation, Synthesis, Back Translation, Expert Committee, and Pre-Test, consistent with Beaton et al.'s guidelines and represented in Table 1 [20]. In the first stage, one informed neurologist and one uninformed psychologist independently translated the SSEQ into Persian (T1 and T2). In the second stage, previous experts synthesized a new version of the translated questionnaire (T12) together with their previous translations (T1 and T2). In the third stage, two uninformed experts in Persian-to-English translation independently back-translated the Persian synthesized version (T12) to their independent English versions (BT1 and BT2). In the fourth stage, an expert committee of 3 neurologists and two psychologists evaluated the quality of produced materials and the whole process in terms of semantic, idiomatic, experiential, and conceptual

**Table 1.** Description of the process of translation and validation of SSEQ-P.

Stage	Description	Participants
Stage I Initial translation	Two independent Persian translations (T1 and T2) by two translators	1 Neurologist (informed) 1 Psychologist, PhD (uninformed)
Stage II Synthesis	Synthesis of T1 and T2 for T12	The two translators above.
Stage III Back translation	Two translators who were experts in the English language independently back-translated T12 to BT1 and BT2.	Two expert Persian-to-English translators (uninformed)
Stage IV Expert Committee	The quality of the process for achieving semantic, idiomatic, experiential, and conceptual equivalence with the original questionnaire was evaluated by analyzing all materials	3 Neurologists 2 Psychologists, PhD
Stage V Pre-test	The questionnaire was administered to stroke survivors, inquiring about their comprehension of its items	30 stroke survivors in the sub-acute phase

SSEQ-P: Persian version of the Stroke Self-Efficacy Questionnaire.

equivalence with the original SSEQ. After the expert committee validation, in the last step, the SSEQ-P was administered to 30 stroke survivors who were consecutively selected from the first included participants for final validation. The study size of this stage was retrieved from the guidelines by Beaton et al. [20]. To evaluate the relevance and difficulty of the SSEQ-P, the questionnaire was administered to these participants under the supervision of a physiotherapist or occupational therapist, who was available to assist with any difficulties in interpreting or comprehending the items based on the manual. Following this, the participants were individually interviewed to ensure their comprehension of each item, which was then compared to the intended meaning of the original questionnaire.

## 2.2. Setting

This study was conducted in the neurology ward of an academic hospital from March 2020 to March 2021. Demographic and clinical data were collected by a medical student before discharge. After discharge, stroke survivors were sent to a neurology clinic for neurologic examinations by an expert neurologist and were included in the study if the inclusion criteria were met. After that, physical examination, General Self-Efficacy Scale (GSE), and SSEQ-P data were collected by a medical student proficient in local accents.

## 2.3. Participants

One hundred and twenty-four stroke survivors who had experienced a stroke for the first time and were in the sub-acute phase (between 2 weeks and three months) of their stroke were recruited from the neurology ward of an academic hospital in Guilan, Iran. This hospital (Poursina Hospital, Rasht) is the stroke center in the province and the majority of stroke patients in the province are referred to this hospital. Inclusion criteria included voluntary participation, single-type stroke (ischemic or hemorrhagic), ability to read and write in Persian, and mild to moderate National Institutes of Health Stroke Scale (NIHSS) score of 14 or less [21]. The type and location of the stroke were determined by an expert neurologist using brain CT and MRI imaging. We excluded participants with Wernicke's aphasia, transcortical sensory aphasia (TSA), cerebral venous infarction (CVI), subarachnoid hemorrhage, multiple stroke attacks of both hemispheres or other types of stroke, cognitive impairment with mini-mental state examination (MMSE) score of 24 or less [22] and those who had no sufficient cooperation. Participants

provided data about their age, gender, marital status, educational level, occupation, smoking, alcohol and drug usage, comorbidities, and stroke features.

## 2.4. Variables

In this study, we focused on assessing stroke survivors' self-efficacy using SSEQ. This questionnaire was developed by Jones et al. to measure the level of confidence within the scope of activities and self-management in stroke survivors [13]. This tool comprises 13 questions that can be answered on a ten-point scale, where 0 is *not at all confident* and 10 is *very secure*; the total score can range from 0 to 130, where participants with greater self-efficacy get a higher score. A Cronbach's alpha coefficient of 0.90 for SSEQ was reported by Jones et al. which indicates high internal consistency [13].

The GSE-10, designed by Schwarzer and Jerusalem in 1995, is a scale used to predict a general sense of perceived self-efficacy to assess coping with daily problems [23]. This tool consists of 10 questions; each can be answered from 1=*not at all true* to 4=*exactly true*, and scores can range from 10 to 40, where a higher score indicates a more heightened sense of self-efficacy in managing daily problems. The Cronbach's alpha of its Persian version has yielded the result of 0.82 by Rajabi [24].

## 2.5. Statistical analysis

Statistical analysis was performed by SPSS software version 23 and SmartPLS version 3. Continuous variables were analyzed using descriptive statistics, and for categorical variables (e.g. gender), we used frequency. Skewness and kurtosis of the data distribution were checked to determine the normality. To check the validity of the SSEQ, content validity was performed using face validity. We used the factor analysis based on the partial least squares approach. Pearson's correlation coefficient was used to evaluate the convergent validity and test-retest reliability. Internal consistency was used for the reliability domain and assessed using Cronbach's alpha. The significance level was set to below 0.05.

## 3. Results

### 3.1. Descriptive data

In this study, 124 participants were included with a mean age of (63.27 ± 11.73 years), males (55.6%), and married (87.9%). See Table 2 for more details.

In this study, the majority of the participants were male, with a low level of education, between the ages of 65 and 75 years, married, and with ischemic type of stroke. Descriptive indices of main variables are presented in Table 3.

In Table 3, the mean values of SSEQ-P and GSE are reported ( $87.99 \pm 37.09$ ) and ( $26.52 \pm 6.59$ ), respectively. Also, the results showed that the skewness and kurtosis indices were in the range of  $-2$  to  $2$ , indicating the normality of the data distribution. As a result, parametric tests were performed.

**Table 2.** Demographic and clinical characteristics of the participants ( $n=124$ ).

Characteristics	Frequency, $n$ (%)
Age (years)	
≤55	22 (17.7)
55–65	37 (29.8)
65–75	39 (31.4)
>75	26 (20.9)
Mean age $\pm$ SD	$63.27 \pm 11.73$
(Min, Max)	(28, 90)
Gender	
Male	69 (55.6)
Female	55 (44.4)
Marital status	
Single	4 (3.2)
Married	109 (87.9)
Divorced/separated	4 (3.2)
Widow/widowed	7 (5.6)
Educational level	
Elementary to high school	90 (72.6)
Diploma	27 (21.8)
Bachelor's degree	6 (4.8)
Master's degree	1 (0.8)
Occupation	
Self-employed	29 (23.4)
Retired	36 (29)
Homemaker	45 (36.3)
Other	14 (11.3)
Type of stroke	
Ischemic	88 (71)
Hemorrhagic	36 (29)
Location of stroke	
Right hemisphere	62 (50)
Left hemisphere	62 (50)
Stroke severity (based on NIHSS)	
Mild (1–5)	65 (52.4)
Moderate (6–13)	37 (29.8)
Severe (14–42)	22 (17.7)
Smoking habit	
Non-smoker	82 (66.1)
Ex-smoker	20 (16.1)
Chronic smoker	22 (17.8)
Use of alcohol	
Yes	9 (7.3)
No	115 (92.7)
Drug addiction	
Yes	13 (10.5)
No	111 (89.5)
Comorbidities	
Diabetes mellitus	47 (38.3)
Hypertension	75 (60.2)
Psychiatric disorders	19 (15.3)

NIHSS: National Institutes of Health Stroke Scale; SD: standard deviation.

### 3.2. Validity

The face validity of our questionnaire was evaluated and confirmed by five experts. Content validity was verified using the Content Validity Ratio (CVR) and Content Validity Index (CVI). To determine CVR, we asked five experts to categorize each question in one of these three categories: Necessary (1), Helpful but not Necessary (2), and Not Necessary (3). In this study, both indices were calculated as 1.

SSEQ and GSE questionnaires were administered to participants to check the convergent validity. The results are presented in Table 3. The result of Pearson's correlation coefficient ( $r=0.669$ ) is indicative of a high convergent validity.

The results showed that the overall SSEQ score positively and significantly correlated with each of the 13 questions. The correlation coefficients ranged from 0.80 to 0.92 ( $p < 0.05$ ). The results indicated an Average variance extracted (AVE) of 0.75, more than 0.50, indicating a valid convergent validity. Also, the Standardized Root Mean Square Residual (SRMR), as a general fit index, resulted in 0.07 in the present study, which is  $< 0.08$ , indicating that the factorial model of the current study owns a favorable fit as a single factor. Table 4 shows that the factor loadings of SSEQ items ranged from 0.41 to 0.92 at the significance level of 0.01, confirming the validity, which can also be seen in Figure 1.

### 3.3. Reliability

To determine the test-retest reliability of the SSEQ-P, this questionnaire was administered to 30 people in a time interval of two weeks. Test-retest reliability resulted in 0.80 by Pearson correlation coefficient, indicating the high reliability of this questionnaire over time. The internal consistency of this questionnaire was  $\alpha=0.97$  by Cronbach's alpha coefficient in 124 participants, showing favorable internal consistency.

## 4. Discussion

In this study, we aimed to evaluate the validity and reliability of the Persian version of SSEQ. We explained the successful translation and validation of SSEQ into

**Table 3.** Descriptive statistics of variables.

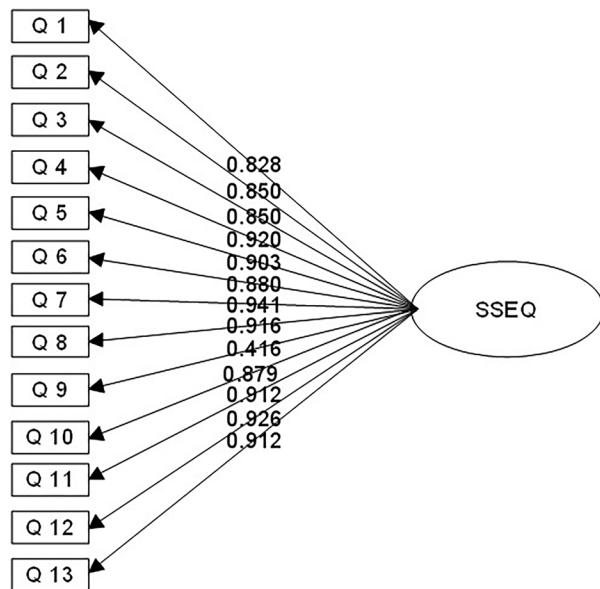
Variable	Min	Max	Mean $\pm$ SD	Skewness	Kurtosis	Pearson correlation coefficient
SSEQ-P	0	130	$87.99 \pm 37.09$	$-0.648$	$-0.112$	0.699
GSE	10	40	$26.52 \pm 6.59$	$-0.789$	$-0.596$	

SD: standard deviation; SSEQ: Stroke Self-Efficacy Questionnaire; GSE: General Self-Efficacy Scale.



**Table 4.** Results of confirmatory factor analysis.

Item	Factor-loading	Sig
1	0.82	$p \leq 0.01$
2	0.85	$p \leq 0.01$
3	0.87	$p \leq 0.01$
4	0.92	$p \leq 0.01$
5	0.90	$p \leq 0.01$
6	0.88	$p \leq 0.01$
7	0.94	$p \leq 0.01$
8	0.91	$p \leq 0.01$
9	0.41	$p \leq 0.01$
10	0.87	$p \leq 0.01$
11	0.91	$p \leq 0.01$
12	0.92	$p \leq 0.01$
13	0.91	$p \leq 0.01$

**Figure 1.** Factor loadings of SSEQ.

Persian, and we also assessed and submitted the face validity and internal consistency of the Persian version of SSEQ. For stroke patients, learning new skills and behaviors is essential to their recovery process [25]. By implementing self-efficacy in their practice, physicians can enhance patients' rehabilitation process and promote better functional outcomes [26]. Our translated version of SSEQ was found to have strong content validity, consistent with Portuguese (CVI = 0.93) [17], Turkish (CVI = 0.95) [14], and Chinese (CVI = 0.97) [15]. These high values of CVI might be associated with the specialized characteristics of the scale for cases who survive stroke. Additionally, while determining coherence among scale items, our study was found to have excellent internal consistency with a Cronbach Alpha of 0.97 for the Persian version of SSEQ, which was consistent with the original version ( $\alpha=0.9$ ) [13], Turkish ( $\alpha=0.93$ ) [14], Chinese ( $\alpha=0.92$ ) [15], Danish ( $\alpha=0.80$ ) [16], and Portuguese ( $\alpha=0.82$ ) [17], suggesting decent psychometric features. Cronbach Alpha

ranging from 0.80 to 1.00 is assumed favorable, indicative of the reliability and consistency of items with each other. Test-Retest in our version of SSEQ owns a high reliability, which is consistent with Chinese [15], Portuguese [17], and Turkish [14] versions and indicates a robust relationship between test and retest and favorable stability and constancy of the SSEQ over time. One of our study's downsides was a lack of academic education and a low education level, so 72.6% of participants had only elementary to high school education. In comparison, Chinese 92% [15], Turkish 82% [14], and Danish 66% [16] had an equally low education level. Despite cultural and social class differences in separate studies in which SSEQ was validated, lack of academic education was a similar feature in stroke patients. Kristensen et al. showed that 73% of participants answered the SSEQ as easy or very easy [16]. In our study, the majority of participants were male, which is in line with previous studies. A systematic review found that the incidence rate of stroke was 33% higher in men and the prevalence of stroke was 41% higher in men than in women. The exact cause of this gender disparity is still unknown, but there are several theories, including the effect of genetic factors, the protective role of estrogen on cerebral circulation, and higher rates of stroke-related risk factors in men, such as higher blood pressure, ischemic heart disease, peripheral artery disease, and cigarette smoking [27].

An essential aspect of the physical rehabilitation process is self-efficacy [13]. Because self-efficacy indicates a person's ability to prioritize healthy behaviors, we can assume that greater self-efficacy relates to stroke patients' better evaluation of their health condition. The greater levels of self-efficacy indicate a person's high capacity for change, and self-efficacy is likely very task-related [28]. The confidence level reported by self-efficacy can show a person's thoughts and feelings about their health [25]. Focusing on self-efficacy is related to changes in lifestyle and quality of living [29], stability [30], strength [31], and post-stroke emotional condition. Therefore, recovery procedures targeting self-efficacy and task-specific programs can improve these specific task management in day-to-day life and boost confidence, encouraging the patient to participate in more healthy tasks. Confidence is related to decreasing depression and choosing a healthier lifestyle [29]. Recently, neurorehabilitation centers have become more aware of self-efficacy's significance, and we are witnessing more studies with this in mind [32]. This measure is equally or even more important than biological measures because it reveals patients' insight about their ability to change. Since

the rehabilitation centers are focused on changes in behavior, data gathered from this questionnaire can provide the essential knowledge needed to achieve the best results for the patient. It would be better to prepare more interviews with patients when determining the difficulty of the questionnaire. Also, the expert panel in charge of validating CVR and CVI comprised five members; we suggest consulting more experts in future studies as it adds to the diversity and reveals different points of view.

Our study faced certain limitations. Firstly, our study group consisted of individuals in the sub-acute phase following a stroke, which may constrain the conclusions' applicability to other disease stages. Additionally, the sample did not contain individuals with aphasia, thus reducing the generalizability of the findings to those with speech and communication difficulties. Moreover, the study was conducted at a single location, making it uncertain whether the results can be generalized to the broader Iranian population. To produce more robust evidence, further studies with more extensive and diverse samples are recommended.

In conclusion, the translation and validation of SSEQ into Persian was successful, with good reliability and validity. This tool can provide helpful information for clinicians to assess the self-efficacy of post-stroke patients and organize educational and clinical programs.

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### Ethical approval

This research was approved by the Medical Ethics Committee of Guilan University of Medical Sciences, Rasht, Iran (Registration Number: IR.GUMS.REC.1399.608). Informed consent was obtained from all participants.

### Consent for publication

Not applicable.

### Authors' contributions

Fatemeh Dadar: data gathering, writing manuscript. Alia Saberi: conceptualization, data gathering, final reviewing, supervision. Sajjad Saadat: conceptualization, methodology, statistical analysis. Mozaffar Hosseini-zhad: final reviewing, supervision. Samaneh Ghorbani Shirkouhi: designing proposal. Nasim Athari: designing proposal, data gathering. Kasra Sarlak: editing and writing manuscript, proofreading.

Nima Broomand Lomer: editing and writing manuscript, proofreading.

### Disclosure statement

We declare sincerely that an abstract of this project was presented at a national congress in Iran (BCNC 2022 congress).

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### Data availability statement

The datasets used and analyzed during the current study are available from the corresponding author upon reasonable request.

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