Original Article

Standardization of Connor-Davidson Resilience Scale in Iranian subjects with Cerebrovascular Accident

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ABSTRACT

Background: Resilience is a personal trait that can influence the stroke subjects' attitudes toward future opportunities and facilitate the transitional process and adaptation in them. Assessment of this trait in stroke subjects with a standardized tool would promote the rehabilitation protocols and occupational therapy interventions. Therefore, the objective of this study was to standardize the Connor-Davidson Resilience Scale (CD-RISC) for Persian Iranian people who have had strokes.

Methods: A descriptive observational study was adopted in order to standardize the CD-RISC in stroke population. The population was comprised of 34 female and 29 male subjects with a mean age of 51.4±10.6 years and the history of ischemic or hemorrhagic cerebrovascular accidents. Subjects were recruited based on inclusion criteria within the period of two months between May and July of 2014. Descriptive statistics were calculated along with the Cronbach's alpha to determine reliability. Standard multiple regression analyses searched for any correlation between variables and resilience.

Results: Statistical parameters revealed a mean of 58.4±15.5 for CD-RISC raw scores. Percentile ranks were also calculated from raw data. Cronbach's alpha of 0.892 revealed that the CD-RISC had high reliability for the population of this study. Multiple regression analyses showed that the functional status was the only variable that uniquely predicted subjects' resilience (ß=0.41; P<0.01).

Conclusion: The findings of this research confirmed applicability of CD-RISC in Iranian people who have had strokes. The standardized CD-RISC was determined to be suitable for use in the clinic and for utilization in research studies in Iranian people status post-stroke.

Introduction

Cerebrovascular accident (CVA), commonly called

stroke is a condition in which blood flow to cerebral vessels becomes disrupted, due to reasons such as clot or rupture that subsequently disrupts blood supply to brain tissue and causes deficits in the function of this organ [1]. It is one of the leading cause of mortality and morbidity worldwide [2]. There is a lack of comprehensive epidemiologic studies to show the prevalence and

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incidence rate of stroke in Iran, because the existing studies were collected in regional areas of Iran. One systematic review article analyzed incidence rate of stroke in various parts of Iran and reported a wide range of 23 to 104 per 100000, of which the case fatality rate was 19% to 32% at the first month after stroke [3]. With advances in medical care, a large percentage of people with stroke survive as the chronically disabled [4]. These chronically ill survivors suffer from various limitations in occupational tasks including self-care, household work, and social activities [5]. It has been shown that attitude of stroke subjects towards their ability to exert control in the resulting situation in life determines the degree of improvement and return to life's routine [6]. In this situation, the positive and constructive attitude can facilitate the transitional process so that the individuals can adapt and cope with the new situation that effects their ability to return to function in daily activities [7].

Generally, people with chronic illnesses must learn coping skills and apply them to meet their daily challenges. Resilience is the successful adjustment to challenging situations in life, such as the ability and skill to adapt to an acute or chronic condition [8]. Resilience facilitates the transitional process and the learning of adaptive methods in subjects with chronic diseases [9]. It is important for occupational therapists to appreciate resilience as a valuable personal trait that can influence attitude and positive adaptation to the conditions following stroke. Therefore, identification of resilience traits in clients and importance to the adaptation response will promote development of protocols and interventions to foster resilience in people that have little of this beneficial trait [10-11]. Within the cognitive domain including decision making, creativity, problem-solving, planning, and self-esteem, represent the skills that are directly related to the quality of the resilience [12]. Therefore focus on these cognitive capacities in rehabilitation protocols might lead to fostering resilience in stroke subjects [10].

Assessment is fundamental to design an appropriate treatment plan that considers the development of occupational activities to facilitate resilience. The assessment of resilience leads to identification of strengths and weaknesses [13], which can contribute an integral part of evaluation of clients to obtain the whole picture of occupational performance.

The Connor-Davidson Resilience Scale (CD-RISC) was devised as a simple, practical self-rating scale to rate and quantify characteristics of the resilience trait [14]. The scale has 25 items, each of which is scored from 0-4. Respondents rate items on a scale from absolutely false (0) to always true (4). The full range is from 0 to 100, with greater scores reflecting higher resilience. The inventors of CD-RISC [14] summarized 17 most notable characteristics of resilient people, some of which include: "View change or stress as a challenge/opportunity", "Recognition of limits to control", "Personal or collective goals", "Strengthening effect of stress", "Realistic sense of control/having choices", "Action-oriented approach", "Tolerance of negative affect", and "Adaptability to change" (p.77).

The CD-RISC has been of great interest among Iranian researchers and practitioners. The feasibility of the scale has been verified in several Iranian studies in different population for use with people with substance dependency [15], chronic pain [16], and spinal cord injury [17].

As the CD-RISC was not intended for just one specific population, the creators supported expansions of the tool by other researchers [18]. The CD-RISC has not been reported in the literature to have been standardized for people who were status post- strokes, in any country thus far. Therefore, in order to conduct a study of people who demonstrate resilience behaviors following strokes, it was necessary to obtain standardization values for this instrument on the population to be studied. Then, the specific aim of this study was to provide a standardized test of CD-RISC for Persian Iranian people who have had strokes for use in the clinic and for utilization in research studies.

Methods

This study was a descriptive observational study [19] that was conducted, in order to standardize the CD-RISC for reliable use with Iranian people who have had strokes. Standardization psychometric research examines an assessing instrument to approve its use for the target population [20]. Some of the standardization studies include those that set a specific protocol for the procedure of test administration, materials applied in the test, scorings the test results, and judging the tests results [21]. In terms of judging the tests results, there are two main types of standardized tests: norm-referenced and criterion-referenced tests. Criterion-referenced tests examine the performance against a predefined or arbitrarily criterion. Norm-referenced tests examine the performance against a norm and can illustrate how the performance of an individual with specific condition is in comparison to other people with the same condition. The standardization studies providing a norm-referenced test are called norming studies. In such studies, individuals are selected to comprise a representative group of people with specific condition, known as a normative sample or normative group. Then, the statistical calculations such as estimation of mean, standard deviation and percentile ranks are performed on the raw scores resulting from normative group. These standardized statistical parameters can be the basis for the evaluation of other people with the same condition as the normative group. For instance, by comparing a person's performance to the range of scores obtained by normative group, it can be considered whether he/she performed better or worse than someone with average performance in the normative group [20].

The statistical sample of this norming study were subjects with ischemic or hemorrhagic cerebrovascular accident. Sampling units were three public and two private healthcare institutions under the supervision of Shiraz University of Medical Sciences. Data collection was obtained by recruitment of subjects referred by the aforementioned institutions within the period of two months between May and July of 2014. The inclusion

criteria were: people between 18 to 65 years old, passage of at least 6 months from the onset of stroke, and the score of 23 and above obtained on the Mini Mental Status Examination (MMSE). All the participants would be able to withdraw from the research at any time of the research.

The sampling procedure began after approving the research project by the Research and Ethics Committee of Shiraz University of Medical Sciences. Available individuals were identified first, then if they met the criteria for the age and time post-stroke, objectives of the study were explained to each person. If an individual consented to participate in the study, then the informed consent was obtained. Acceptable level of cognitive skills was the essential requirement to participate in this study; therefore to be sure of this criteria the subjects had to score at least 23 on the MMSE. The MMSE test consists of 19 questions that examined the cognitive state in general. Potential scores ranged from 0 to 30. The MMSE was validated for use with the Iranian population and the score of 23 was the cutoff point [22].

When a participant satisfied all the criteria for inclusion in the study, he/she was provided with CD-RISC and a questionnaire containing a question about the participant's judgment about his/her functional status in daily activities and some questions to gather demographic information. Questions were read by the researcher if participants could not perform a written response. According to CD-RISC the subject was directed to respond to each question with reference to the previous month, if the subject had no experience with any item then he/she was asked to respond according to what the person thought they would have reacted.

Jowkar (2007) translated the CD-RISC into Persian under supervision of CD-RISC inventors and standardized the scale in Iranian college students [23]. To use the Persian version of CD-RISC, we obtained verbal permission from its inventors.

Statistical Analysis

To standardize the scale for subjects in this study population, the descriptive statistical analysis such as mean, standard deviation, and percentile ranks were performed. The statistical method of Cronbach's alpha

examined the reliability of the CD-RISC. It is frequently used as one type of measuring reliability for evaluating the internal consistency of a test. The coefficients values of 0.70 or above are commonly considered optimal for internal consistency [20]. Standard multiple regression analyses was used to search for any correlation between variables and the level of resilience.

Results

One hundred eight cases with cerebrovascular accident were identified during the two months period of sampling, of whom only 63 cases met the inclusion criteria and participated in the study. The mean age of the participants was 51.4 with a standard deviation of 10.6, among them the minimum and maximum ages were 24 and 65 respectively. Demographic characteristics and functional status of participants in research was shown in Table 1.

As mentioned earlier, statistical parameters such as mean, standard deviation and percentile ranks needed to be produced on the normative sample raw data in order for the CD-RISC to be standardized in participants of this research. Table 2 shows the results. As shown by the data in Table 2, the mean score of resilience scale was 58.4±15.5.

The lowest score of CD-RISC was 18 and the highest score was 92. Cronbach's alpha of 0.892 revealed that the CD-RISC had good reliability for the population of this study.

Standard multiple regression analysis used to find the answer to the question of how the variables of age, gender, education level, marital status and functional status as potential predictor variables could be able to predict the level of resilience of the participants. R-squared value of 0.231 was obtained for the regression model (P<0.01). This value indicated that the regression model explained 23.1% of the variance in the level of resilience. The outcomes from regression analysis showed that only the functional status with Beta standardized coefficient of 0.41 made unique contribution to the prediction of resilience (P<0.01). The other Beta standardized coefficients were not significant (P>0.05). This meant that individuals with greater independence had greater resilience.

Table 1: Demographic characteristics and functional status of participants in the study

Variables		Frequency	CD-RISC score (Mean±SD)
Age (year)	18-45	17	62.6±16.7
	46-65	46	56.9±14.9
Gender	Female	34	57.6±14.3
	Male	29	59.4±17.04
Education level	Up to diploma	47	55.9±16.1
	College undergraduate	15	66.8±10.6
	College postgraduate	1	52
Marital status	Single	3	61.3±8.08
	Married	60	58.3±15.9
Functional status	Independence	9	76.6±11.7
	Need help in some occasions	30	57.7±15.7
	Need help in most occasions	24	52.6±11.3

Statistical parameters		CD-RISC score
Mean±SD		58.4±15.5
Median		56
Percentile ranks	25 (first quartile)	48
	50 (second quartile)	56
	75 (third quartile)	69

Discussion

This study aimed to determine the normative function of stroke subjects on CD-RISC. This issue was established with the extraction of mean, standard deviation and percentile ranks from raw data of assessment with CD-RISC. In this study, the mean score for CD-RISC was 58.4±15.5. This value could be utilized as of average resilience for future research studies with Iranian stroke subjects. Percentile ranks typically specify the percentage of the raw scores that are less than a specific raw score across the raw scores distribution. For example, a raw score of 69 on the CD-RISC was found to be in correspondence with the 75th percentile rank (third quartile or upper quartile) (see Table 2) then this meant that 75% of the raw scores in the raw scores distribution were less than 69. In other words, someone with a raw score of 69 on CD-RISC would have greater resilience compared to 75% of normative sample.

A review of existing studies revealed many differences in mean parameters of CD-RISC such that the mean scores of CD-RISC varied in different ethnicities, different environments and situations, as well as different health conditions. As a good case in point in terms of ethnic differences, the mean and standard deviation of CD-RISC in one study in Iranian college students was 58.1±7.4 [24] while this was reported as 72.9±13.5 in the other study in American college students [25].

In terms of the impact and role of environmental factors, the definition of resilience by Richardson et al (1990) was crucial to this discussion. They discussed resilience as the process of the interaction between individuals and environmental circumstances [12]. Based on this discussion, the difference between two Iranian studies with two different mean scores of CD-RISC could be argued. In one study by Ebrahimi et al (2012) the CD-RISC mean was 58.1±7.4 among Hormozgan University students [24] while Khoshouei (2009) reported that the mean of 68.3±17.5 was obtained in the students of Esfahan University [26]. Although in these two studies, nothing was said regarding to the roots of this contradiction, but from the perspective outlined in this article, it can be argued that the contradiction may have been related to the quality of adaption of students to the life event of entering a university. Life events emerge in the form of life experiences and can be a stressful or risky situations that challenges a person's adaptive skills [12]. Accordingly, the act of experiencing a stroke could jeopardize one's health condition, and subsequently challenge one's adaptive skills.

The mean score of CD-RISC in this study was comparable with some Iranian studies such as people with chronic pain (age, 43.8±12.5 years; CD-RISC, 55.9±17.8) [16], people with spinal cord injury (age, 29.5±3.9 years; CD-RISC, 55±20.7) [17] and subjects with multiple sclerosis (age, not mentioned; CD-RISC, 59.1±17.9) [27]. This similar findings may be due to the construct of resilience that showed consistency among Iranians. However, in the other Iranian study on athletes, the mean score of CD-RISC was 74.6±15.5 [28] which was much higher than for people suffering from a neurological condition such as spinal cord injury or multiple sclerosis. Actually, the results of this study clearly indicated the impact of health condition on one's level of resilience.

Although resilience is an internal process and is influenced by a person's health conditions, environmental factors also have the potential to greatly influence one's improvement or deterioration of the capacity for resilience. This is to say that a successful adaptation to emerging challenges in life depends on the agreement between the two factors of personal (internal) and external support resources [29]. The results of the multiple linear regression might be correlated with the aforementioned factors because the regression results showed that the unique significant variable contributing to predict the level of resilience was the functional status that might have considered due to external support resources. In fact, since external support resources have been found to produce the positive attitude of how we interpret personal experiences and quality of our performance [7, 29]; thus, from this perspective, the variable of functional status as a significant predictor for resilience may be justifiable.

Regarding to the relationship between demographic variables and level of resilience, there is conflicting evidence. However, when considering the association between demographic variables and the level of resilience, the findings of this research were consistent with the results of Connor and Davidson (2003) original research, which showed no significant relationship between CD-RISC scores and age, sex and marital status [14].

Access to the suitable cases for this study was difficult because subjects were experiencing the chronicity of their disease. In addition, short time period of sampling process led to decrease the number of cases in this norming study. Future research such as a national survey should be conducted in order to include more cases and enhance the generalizability of findings.

Conclusion

This study adds to the literature by providing CD-RISC standardized values for a small group of Iranian subjects who experienced six months or more of living with a stroke. The mean and percentile ranks obtained from this study could provide the basis for evaluation of other subjects. Therefore, based on the results of this study, if the level of resilience of a hypothetical individual becomes higher than 58, that person has resilience greater than the average of the normative group.

Conflict of Interest: None declared.

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