Psychometric Properties of the Iranian Version of Resources and Support for Chronic Illness Self-management Scale in Patients with Type 2 Diabetes

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Original Article

ABSTRACT

Background: This article is a report of psychometric testing of the Farsi version of Resources and Support for Chronic Illness Self-management (RSSM) scale.

Methods: In this cross-sectional study, a convenience sample of 160 patients with type 2 diabetes, registered with the Charity Foundation for Special Diseases' team-focused diabetes clinic, were recruited (response rate=83.7%; *n*=134). Participants older than 18 years who had active medical files in the system completed the questionnaire. Content validity was established using translation and back-translation procedures, pilot testing of the instrument, and getting views of the expert panel. Construct validity was determined using explanatory factor analysis. Internal consistency was ascertained using Cronbach's alpha. The stability was confirmed using intra-class correlation coefficients.

Results: Using exploratory factor analysis, a five-factor model emerged, which explained 75.24% of the total variance. Internal consistency reliability was sufficient (α=0.70; range=0.66 – 0.87). The intra-class correlation coefficient was 0.74 – 0.81 for individual items.

Conclusion: The RSSM-Farsi seems to be a valid and reliable instrument to measure outcomes of diabetes self-management education programs in Farsi. The RSSM-Farsi version scale could be a useful, comprehensive, and culturally sensitive scale for assessing resources and support for self-management between type 2 diabetic patients.

Keywords: Exploratory factor analysis, reliability, type 2 diabetes mellitus, validity

INTRODUCTION

Non-communicable diseases, including diabetes, are rapidly growing global health problems.[1,2] According to the International Diabetes Federation's Atlas, 2009, a 54% increase will occur in the number of people aged 20 – 79 with diabetes, from 2010 to 2030, in the Middle East and North African (MENA) Region.[2] The explosion of diabetes in the MENA Region is mainly due

to type 2 diabetes. It seems that major social and economic changes, including progressive urbanization, decreasing infant mortality, and increasing life expectancy, which occurred over the past three decades in the majority of these nations, has been associated with tremendous modification in lifestyle toward the westernized pattern, reflected by changes in nutrition, less physical activity, tendency for obesity, and increased incidence of smoking.[2] Moreover, diabetes is the expected cause of some 290,000 deaths in this region, which will account for 11.5% of all deaths in the 20 – 79 age groups in 2010.[2]

Diabetes is a 24 hours per day, seven days a week condition. Once diabetes has been diagnosed, the patients are confronted with the need for various treatment methods such as oral hypoglycemic agents or insulin, and lifestyle adaptation (weight reduction, adapted nutrition, and exercise). Diabetic patients are increasingly encouraged to play a major role in the management of their disease.[3] The results of various studies show that people who actively manage their diseases have better healthcare outcomes.[4]

Diabetes care providers should provide skills and resources to patients in order to have successful outcomes and cope with numerous social and environmental challenges to healthy living. Valid and reliable instruments are required to assess the outcomes of these programs. Before developing the 'Resources and Support for Self-management' (RSSM) scale, very few instruments could be used to assess the extent to which self-management programs were successful. Those measures tended to be very long, and were not practical for widespread use by health professionals.[5] The RSSM monitors and evaluates an individuals' access to and receipt of diabetes self-management services.

McCormack *et al*. developed the RSSM as a survey component of the evaluation of the Robert Wood Johnson Foundation's Diabetes Initiative.[5] In the development process, the Patient Assessment of Chronic Illness Care (PACIC)[6] served as an important starting point, with a 20-item survey that provided a patient's perspective on the receipt of model-related chronic illness care. New items, focused on domains not addressed by the PACIC were drafted, including ongoing follow-up and support and community resources. After two rounds of cognitive testing with a total of 14 participants to identify and correct problems within the questionnaire, the scale was developed including 10 items that were altered from the PACIC, and seven new items. The psychometric analysis of the developed instrument showed the scale to be valid and reliable for use in diabetic populations.

To date, there is no published instrument available in Farsi that can be used to measure the resources and support as an outcome in diabetes self-management education programs. Moreover, it is not clear if a Western-developed measure of the RSSM can be used by Farsi-language healthcare providers, because the cultural context of these countries are specific, and the social environment and individual value systems are different from Western countries. We used the RSSM as a well-developed instrument and assessed the validity and reliability of the Farsi version to address this gap.

METHODS

This study adopted a cross-sectional design, to examine the validity and reliability of the RSSM-Farsi version scale. In order to ensure the quality of the adapted instrument, we carried out the study phases based on the international norms.[7] The phases carried out were: First, translation into Farsi from the English version and back translation into English; second, content analysis by a panel of specialists; and third, psychometric testing (factor analysis, a reliability coefficient, and stability).

RSSM-Farsi version-translation and pilot study

The translation and back translation procedure was used to develop a culturally equivalent questionnaire.[8] The instrument was translated from English to Farsi independently by a translator and an English language specialist. We compared the two translated versions and developed a common Farsi text from these two Farsi translations. The translated scale was then back translated into English by two English language specialists who had not seen the original English text. The English statements that had been translated from Farsi into English were compared with the original statements and necessary revisions were made. We then conducted a pilot study to test whether the translated scale was easy to comprehend by

Iranian patients. Participants from a convenience sample of 10 patients attending a diabetes clinic completed the questionnaires to present comments on their understanding of the items. The results showed that the questions were understandable to these individuals. It was completed easily and very quickly (less than 10 minutes). The results of this pilot study were not included in the larger study.

Subsequently, we submitted the translated version of the RSSM to six specialists,[9] including two health education professionals, two endocrinologists, and two physicians. We asked the experts to evaluate the understandability and the extent to which the items adequately measured what we were setting out to measure. We then asked the experts to evaluate the understandability of the items.

Sample and setting

The study population was recruited from the diabetic patients registered with the Charity Foundation for Special Diseases' (CFSD) diabetes clinic. This large team-focused clinic was estimated to have a large number of diabetic patients (N=6000). All participants were recruited through convenience sampling. We worked with the practice receptionists to invite the patients to participate in the study from March 2008 to May 2009. The participants were all older than 18 years; and had been referred to the clinic at least once during the last year. We invited 160 type 2 diabetic patients to complete the questionnaire. The response rate was 83.7% (134/160). Those who did not participate stated that they were not interested or did not have time. We excluded six of the 134 respondents, because they had one or more missing responses to the RSSM-Farsi version. It was suggested that a sample size of 100 was fully adequate and a sample size of 250 or more was excessive for estimating the parameters of a measurement model;[10] therefore, we used data from the remaining 128. Furthermore, a subsample (n=26) of the total respondents was randomly selected and asked to complete the same scale two weeks later, to examine the test–retest reliability. Valid data on both occasions were obtained from 20 respondents.

The aims and procedures of this study were approved by the appropriate human research ethics committee. Permission was also obtained from the authors of the scale. All the diabetic patients who participated in the research were informed about the research and the purposes, and were ensured that all information collected would remain confidential. Every participant signed an informed consent form. Patients completed the questionnaire in a designated private area at the clinic, staffed by one of the researchers who was available to answer questions if necessary. If the participants had difficulty completing the questionnaire, the researcher filled in the instrument based on a face-to-face interview.

Instrument

The resources and support for chronic illness self-management[5] is a 17-item self-report scale with subscales reflecting five areas of RSSM: (1) individualized assessment (two items); (2) collaborative goal setting (three items); (3) enhancing skills (three items); (4) ongoing follow-up and support (seven items); and (5) community resources (two items). The items of the scale are evaluated on 5-point Likert-type scales (1=never, 2=rarely, 3=sometimes, 4=usually, 5=always). Points are added to obtain a total score, with higher scores indicating more RSSM. The psychometric testing of the original scale showed that the overall scale and five subscales were internally consistent (Cronbach's $\alpha \geq 0.70$) and were significantly, positively related to diabetes self-management behaviors, supporting the construct validity.[5]

RESULTS

General characteristics of the respondents

One hundred and twenty-eight participants completed the survey. The mean age was 57.6 years (SD=8.1) ranged from 34 to 75 years. Most of the respondents (61.7%) were women; 77.3% were married; and 65% had a family history of diabetes. Less than half of the patients (48.4%) had at least six years of education; 46% had diabetes for five to nine years; and 71.1% were using oral hypoglycemic agents. The means and standard deviations for the total instrument and subscales are shown in Table 1. Item for total correlation coefficient was calculated for the items of the scale. The items were within acceptable limits and had significant correlation (0.41 – 0.88) [Table 1].

Psychometric characteristics of the RSSM-Farsi version

Construct validity

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.71, indicating sampling adequacy, and the Bartlett's test of sphericity was statistically significant ($\lambda 2=1138.56$, df=136, $P<0.0001$), suggesting correlations between variables. The underlying dimensional structure of the RSSM was checked with an exploratory factor analysis (EFA), by the principal component extraction method using varimax rotation with Kaiser normalization as a usual descriptive method for analyzing the grouped data.[11] There were five factors with 17 items in the model. The five factors explained 75.24% of the total variance. This result offered preliminary support for construct validity [Table 2]. The first factor (F1), ongoing follow-up and support, including five items, explained 22.1% of the total variance. The second factor (F2), enhancing skills, including four items, explained 18.3% of the total variance. The third factor (F3), collaborative goal setting, including three items, explained 13.9% of the total variance. The fourth factor (F4), community resources, including three items, explained 12.2% of the total variance. Finally, the fifth factor (F5), individualized assessment, including two items, explained 8.5% of the total variance.

Table 1: Item analysis of the RSSM-Farsi scale

Items	Mean	SD	Item total correlation
In the past three months, how often did someone on your diabetes care team enquire about what is important to you, when helping you manage your diabetes?	2.92	0.81	0.50
In the past three months, how often did someone on your diabetes care team ask you questions about your health habits?	2.83	0.87	0.44
Has anyone on your care team ever helped you make a plan to take care of your diabetes?	2.28	0.91	0.67
Has someone on your care team ever helped you set goals to take care of your diabetes?	2.46	0.79	0.78
In the past three months, how often did someone on your care team check to see how you are doing with your goals?	2.02	0.64	0.53
In the past three months, has anyone on your diabetes care team taught you how to deal with stress or feeling sad, if so how often?	2.15	0.79	0.66
In the past three months, how often did someone on your diabetes care team teach you how to take care of your diabetes?	2.34	0.48	0.41
In the past three months, how often did someone on your diabetes care team teach you how to deal with problems that come up?	2.02	0.61	0.52
Does someone on your diabetes care team schedule appointments to review how your diabetes is doing even when you are not sick?	1.51	0.61	0.49
In the past three months, how many times did you talk to or meet with someone on your diabetes care team?	1.34	0.71	0.58
In the past three months, did someone on your diabetes care team help you find support groups or others ways where you could talk about your diabetes?	2.34	0.82	0.67
In the past three months, how often did someone on your care team help you get medicines and other supplies for your diabetes?	1.83	0.60	0.73
In the past three months, how often did someone on your care team ask you about any problems with your medications?	3.85	0.83	0.82
In the past three months, how often did you get the information you needed from your diabetes care team?	3.01	0.87	0.67
In the past three months, how often did someone on your diabetes care team contact you to see how things are going between appointments?	1.02	0.60	0.45
How many programs or activities are there in your community now to help with your diabetes?	2.35	0.83	0.88
In your community, how much overall support is there for people with diabetes?	3.23	0.85	0.83
Total	2.11	0.35	0.73

RSSM: Resources and support for self-management, SD: Standard deviation

Table 2: Exploratory factors and explained variance after rotation for the RSSM-Farsi version

Subscales	Item number	Factors				
		1	2	3	4	5
Ongoing follow-up and support	9	0.74				
	10	0.82				
	13	0.89				
	14	0.86				
	15	0.77				
Enhancing skills	6		0.88			
	7		0.83			
	8		0.65			
	12		0.89			
Collaborative goal setting	3			0.85		
	4			0.89		
	5			0.89		
Community resources	11				0.91	
	16				0.85	
	17				0.87	
Individualized assessment	1					0.90
	2					0.88
Eigen values		3.75	3.11	2.37	2.09	1.45
Variance accounted for		22.11%	18.30%	13.97%	12.29%	8.55%

RSSM: Resources and support for self-management

Reliability

The Cronbach's alpha was examined to evaluate the homogeneity of the items in the scale. The Cronbach's alpha values for all the subscales were in the range of 0.66 – 0.87. The ICC was 0.74 (P<0.001 and 95% CI: 0.70 – 0.77), [Table 3].

DISCUSSION

Our purpose in this study was to assess the psychometric properties of a Farsi version of the Resources and Support for Self-Management scale. The preliminary study demonstrated good internal consistency and construct validity of the scale, as well as its cultural sensitivity. The RSSM-Farsi version had the potential to serve as a tool for healthcare researchers, educators, and managers, as a useful instrument to measure the outcomes of self-management education programs for diabetes and other chronic diseases and even for primary care patients, more generally.

Exploratory factor analysis yielded a five-factor solution in the total sample, which was consistent with a review of the literature and confirmed the importance of each component of the RSSM construct.[12] These findings suggested that resources and support could be categorized into five groups measuring the key aspect of resources and support for diabetes self-management. McCormack and colleagues also identified a five-factor model, which was supported by CFA (CFI=0.97, TLF=0.99, and RMSEA=0.06).[5] In our study, extracted factors 3 and 5 were comparable to factors previously classified as collaborative goal setting, and individualized assessment, respectively.[5] Factors 2 and 4 in our study consisted of items previously classified as 'ongoing follow-up and support'. Item 11, 'In the past three months, did someone on your diabetes care team help you find support groups or others ways in which you could can talk about your diabetes?', previously classified as 'ongoing follow-up and support' was loaded on factor 4, that is, community resources, possibly because the respondents perceived the item close to the supports from community resources. Item 12, 'In the past three months, how often did someone on your care team help you get medicines and other supplies for your diabetes?', also seemed perceived as part of 'enhancing skills' rather than 'ongoing follow-up and support' in the present sample.

The internal consistency of the RSSM-Farsi version was found to be sufficient (Cronbach's

Table 3: The reliability of the RSSM-Farsi scale

Items	Cronbach's alpha	ICC
In the past three months, how often did someone on your diabetes care team ask you about what was important to you, when helping you manage your diabetes?	0.78	0.74
In the past three months, how often did someone on your diabetes care team ask you questions about your health habits?		
Has anyone on your care team ever helped you make a plan to take care of your diabetes?	0.87	0.81
Has someone on your care team ever helped you set goals to take care of your diabetes?		
In the past three months, how often did someone on your care team check to see how you are doing with your goals?		
In the past three months, how often did someone on your diabetes care team teach you how to deal with stress or feeling sad?	0.84	0.80
In the past three months, how often did someone on your diabetes care team teach you how to take care of your diabetes?		
In the past three months, how often did someone on your diabetes care team teach you how to deal with problems that come up?		
Does someone on your diabetes care team schedule appointments to review how your diabetes is doing even when you are not sick?	0.87	0.81
In the past three months, how many times did you talk to or meet with someone on your diabetes care team?		
In the past three months, did someone on your diabetes care team help you find support groups or others ways in which you could talk about your diabetes?		
In the past three months, how often did someone on your care team help you get medicines and other supplies for your diabetes?		
In the past three months, how often did someone on your care team ask you about any problems with your medications?		
In the past three months, how often did you get the information you needed from your diabetes care team?		
In the past three months, how often did someone on your diabetes care team contact you to see how things are going between appointments?		
How many programs or activities are there in your community now, to help with your diabetes?	0.66	0.80
In your community, how much overall support is there for people with diabetes?		
Total	0.70	0.67

RSSM: Resources and support for self-management

alpha=0.70) in our sample. This finding is comparable to the original observation[5] that Cronbach's alpha coefficients were greater than 0.70. The stability of the total items was found to be substantial (ICC=0.74; $P<0.001$ and 95% CI: 0.70 – 0.77). This was an important finding, as the RSSM-Farsi version was designed to measure change over time and would be administered at different points in time. If the scale did not demonstrate temporal stability, users could not be confident that the change in scores represented change in the resources and support rather than measurement error. These findings indicated that the RSSM-Farsi version was capable of measuring RSSM to measure outcomes, with consistency. However, the test–retest reliability of the scale score and individual items should be re-examined in future research with a larger number of participants.

To date, there are no more studies available on the psychometric properties of the RSSM within different linguistic and cultural contexts to compare with the results of our study.

Similar to any research, this study has some limitations. The extent to which these findings can be generalized beyond the population studied is unknown. As all of the participants agreed to take part in the study voluntarily, volunteer bias may exist. As study participants were recruited from a clinical setting, it is possible that these patients were more familiar with the healthcare system than people in the general population. In addition, as in almost all the surveys, the data in the study was

self-reported; so, there may have been a socially desirable response bias.

Our preliminary study provides early evidence for the construct validity of the RSSM-Farsi version. The RSSM-Farsi version is the first instrument of its kind in which individuals' access to, and receipt of, diabetes self-management services in Farsi-speaking populations is assessed, and for this reason, we did not have access to similar studies with which to compare the results. The RSSM scale has important implications, for program directors of diabetes health promoting programs, for providing standardized data in diabetes research. It reflects the diabetic patients' needs for services and provides health planners with a useful instrument to measure the outcomes of diabetes self-management education programs. The importance of this scale is in providing standardized data in diabetes research. Future researchers should seek to validate the instrument among those with diabetes other than Type 2, and to determine whether the scale is sensitive to changes from an RSSM intervention. Moreover, in future studies, researchers should endeavor to use random sampling whenever possible; and should assess response bias by means of a measure to assess correlation with the scale. Additional possibilities for establishing construct validity (e.g., positive correlations with self-efficacy and an internal locus of control) are recommended. Researchers should be encouraged to actively involve patients in developing and adjusting strategies to promote self-management plans.

The RSSM-Farsi version scale is available, upon request, with the corresponding author of this article.

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