Original Article

The Psychometric Properties of the Turkish Version of Self Rated Abilities for Health Practices Scale in the Gestational Diabetes Sample

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ABSTRACT

Background: The Self Rated Abilities for Health Practices (SRAHP) scale is an instrument devised for measuring an individuals' beliefs about self-efficacy for conducting health promotion practices. Using a valid and reliable scale while measuring the individuals' beliefs about self-efficacy may contribute to manage GDM. **Aim:** This study aims to evaluate the psychometric characteristics of the Self Rated Abilities for Health Practices Scale (SRAHP) among women with GDM in Turkey. **Methods:** This psychometric study used a cross-sectional study design. To culturally validate the Self Rated Abilities for Health Practices Scale (SRAHP), different techniques were utilized such as the blind back-translation technique, experts' opinions of the translated version, pilot study that individuals have similar characteristics and are not included in the study. The construct validity of the scale was tested to the exploratory factor analysis and confirmatory factor analysis. Item-total and item-subscale total score, Cronbach's alpha coefficients, and split-half reliability analyses were calculated for the internal reliability of the scale. **Results:** The explained rate of variance was 50.7%, and confirmatory factor analysis concerning the results was acceptable and in good fit. The results showed that the Cronbach's alpha coefficient for the whole scale was 0.91, and for subscales 0.88, 0.83, 0.80, and 0.68, respectively. Spearman-Brown (0.81) and Guttman Split-Half coefficients (0.80) were satisfactory for the whole scale. **Conclusions:** Turkish translation of the SRAHP scale was determined theoretically based, culturally acceptable instrument for the self abilities in women with GDM.

KEYWORDS: *Gestational diabetes mellitus, nursing, psychometrics, self-efficacy, validity*

INTRODUCTION

*I*t is estimated by the International Diabetes Federation (IDF)[1] that 16.2% of live births had some form of hyperglycemia (86.4% of those cases were due to gestational diabetes mellitus (GDM)) in pregnancy. It was determined that annual increases of GDM prevalence in Turkey were higher in the 2014-2016 (11.1%) period compared to the 2004-2007 (5.1%) period.[2]

As is known, GDM has serious health problems that negatively affects both mothers and infants. In order to avoid problems, it is suggested to regulate and maintain healthy lifestyle behaviors.[3] However, based on the results of previous studies in many countries, it was demonstrated that although women with GDM or a history of GDM were provided education they still had problems in adopting and maintaining lifestyle changes.[4-8] In those studies, it was stated that failure was due to the insufficient self-efficacy perception, which is effective in maintaining the behavior change.

Self-efficacy is the belief in displaying behaviors successfully. This concept is frequently used to predict

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Access this article online

Quick Response Code:

Website: www.njcponline.com

DOI: 10.4103/njcp.njcp_578_20

PMID: *******

and explain changes in behavior. Self-efficacy theory argues that individuals have self-motivation and self-reflection, which enable them to have a certain level of control over their opinions, senses, and acts.[9]

According to Bandura (1986),[10] behavior is influenced by belief in capacity and efficiency rather than true ability. If individuals have a strong belief in capacity and efficiency, they will make an effort for certain behavior. It is also stated that behavioral results will be more successful if the efficiency belief is embraced.[11] Improving healthy lifestyle behaviors is at the core of GDM management. Improving and maintaining change in behaviour is possible by increasing self-efficacy. But, in order to evaluate the effectiveness of self-efficacy in education, it is required to deliberately define and measure psychometric determinants. There are several measurement instruments in the literature that evaluate self-efficacy. However, these instruments focus on specific or very general health-related interventions (such as diet, weight management, exercise, practice etc.).[12,13]

The Self Rated Abilities for Health Practices Scale (SRAHP) was designated as a scale, in which all the healthy lifestyle behaviors influencing GDM can be evaluated at once (nutrition, exercise, responsibility in health applications, psychological well-being). For this reason, the primary advantage of using SRAHP scale is the availability to assess attitudes regarding lifestyle. Such a scale can be used subsequent to targeting self-efficacy improving methods to promote promising lifestyle changes. Therefore, our aim was to evaluate the psychometric characteristics of the Self Rated Abilities for Health Practices Scale (SRAHP) among women with Gestational Diabetes Mellitus (GDM) in Turkey.

METHODS

Design and participants
This psychometric study used a cross-sectional study design.

Totally 221 individuals participated in the research. It is recommended by the experts that 5-10 individuals should be included for each item in testing of the scale. Additionally, it was required to include five individuals per item in order to perform a healthy factor analysis.[14,15] Therefore, an average of 8 people for every item on the instrument was included for the sample size during the research.

Furthermore, Hoelter's critical N was evaluated to decide whether the sample size was sufficient in the confirmatory factor analysis. Since the Hoelter index was between 200 and 75, the sample size was evaluated sufficient both values 0.05 (N = 113) and 0.01 (N = 119)

significance levels.[16] The data collection process was ended with 221 participants as the stated values were evaluated as sufficient.

The inclusion criteria were being 18-year-old or higher, having been diagnosed with GDM at least for four weeks, and having no diagnosis of a psychological disorder. In total, 248 pregnant women were determined to be eligible to participate, and 89.1% agreed to take part in the study. (Date: 02.03.2017 No: 2908-GOA, 2017/04-24)

Data collection tools
The Descriptive Characteristics Form and SRAHP scale were filled by the pregnant women in their antenatal visits.

Descriptive characteristics data form
It included questions about the demographic (i.e. age, education status) and obstetric characteristics (i.e. gestational week, number of pregnancy) of women.

Self-rated abilities for health practices scale
It was developed by Becker, Stuifbergen, Oh and Hall (1993)[17] to measure individuals' beliefs about self-efficacy for conducting health promotion practices (nutriment, practice, psychological well-being and responsibility in health practices). There are 28 items in the scale, and they are rated to indicate 'to what extent you can perform the health practices' (from 0 (not at all) to 4 (completely). The scale total-score ranged between 0 and 112, while subscale total-scores ranging from 0 to 28 points. The higher scores from the scale indicate higher self-efficacy levels for the health applications. The subscales of the scale are nutrition (Factor 4 = items between 1 and 7), psychological well-being (Factor 3 = items between 8 and 14), exercise (Factor 1 = items between 15 and 21), and responsibility for health practices (Factor 2 = items between 22 and 28). Factor 1 (7 items) measures the belief of the individual to apply physical activity. Factor 2 (7 items) measures the belief of the individual about communicating with health care providers. Factor 3 (7 items) is related to the individual's ability to manage stress. Factor 4 (7 items) measures the belief of the individual to display healthy nutrition behaviors (e.g. balanced diet, fluid consumption). Its validity and reliability were applied to three different groups such as individuals participating in a health fair (group 1) (N = 88), university students of a health promotion class (group 2) (N = 111), and individuals in a statewide advocacy group for the disabled (group 3) (N = 117). Cronbach's alpha coefficients of the total scale for the group 1, group 2, and group 3 were 0.94, 0.94, and 0. 91, respectively.[17]

Procedures

In this study, the scale adaptation stages were applied that were developed by Gjersing *et al*., (2010).[18] The report of this study followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE).[19]

Translation of the scale items into Turkish

While translating a scale, due diligence should be exercised to use the most common vocabulary and sentence structures of the target language. In addition, the statements must be adapted to the culture of the target language as well.[14,20] In this study, different techniques were utilized to provide content, semantic, and technical equivalence. Semantic equivalence guarantees to protect each item's meaning after being translated. For this purpose, the commonly suggested technique is the blind back-translation technique.[21] The original English scale was independently localized into Turkish by three bilingual experts. As suggested in the literature, the Turkish form was translated back into English by another linguist, fluent in both languages without having reach to the original version.[22] It was determined that there were no significant meaning changes between the versions.

Content validity

Whether the content was suitable was determined by testing if the content of each item in the scale is relevant to the target culture.[22] In testing the equivalence between the original and the translated scale, it is suggested to ask the views of minimum three field experts.[14] In this study, ten experts' opinions were obtained for the Turkish version of the SRAHP. In testing whether the items were suitable, the field experts rated each item with scores ranging from 1 to 4 (1 = it needs significant changes, 2 = it needs less changes, 3 = suitable, 4 = quite suitable). In line with the suggestions of the field experts, necessary revisions were made on the items. In evaluating the intra-rater agreement, the Content Validity Index for Items (ICVI) and the Content Validity Index (S-CVI) were calculated.[23]

Pilot test

Finally, in parallel to the initial methodological research, a pilot study (25 participants) was employed. In identifying the comprehensibility of the instument concerning language and items, it is recommended to apply to 20-30 individuals, who have similar characteristics and are not included in the study.[14,20] All items were easily understood by the pregnant women.

Construct validity

The construct validity of the scale was tested to the exploratory factor analysis (EFA) and confirmatory factor analysis (CFA).

Reliability

Item-total and item-subscale total score, Cronbach's alpha coefficients, and split-half reliability analyses (The Spearman-Brown Coefficient and Guttman Split-Half Coefficient) were calculated for the internal reliability of the scale.

Data collection

This psychometric study was carried out between June 2017 and March 2018 by the researchers. Data were collected in antenatal visits. The average data collection duration was 20 minutes.

Data analysis

The data analysis was conducted through the 'IBM SPSS for Windows version 22.0' and 'IBM SPSS AMOS version 25.0'. In the descriptive features of the individuals participating in the study, the descriptive statistics (e.g. standard deviation, mean, percentage, and number). The exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were conducted for the construct validity of the scale. Item-total, item-subscale total score and Cronbach's alpha coefficients were calculated for the reliability of the scale. Additionally, split-half reliability test was applied. Through the Pearson's correlation analysis, the relation between the item-total and item-subscale total scores was analyzed.

Ethical considerations

In order to conduct this research, the ethics approval was obtained from the Noninvasive Research Ethics Board of the relevant institution (2908-GOA, 2017/04-24). All procedures performed in this research were in accordance with the 1964 Declaration of Helsinki. The participants were informed about the aim of the study, and subsequently, their verbal and written permissions were obtained.

RESULTS

Demographic and obstetric characteristics

Table 1 demonstrates certain features of the participants such as obstetrics and demographics. The mean age of women was 33 ± 5.70. The mean gestational week of the women was 34 weeks. Over half of the sample (52.9%), it was reported that they only used diet therapy for GDM management.

Validity analysis

The ICVI and S-CVI were calculated for the items and was found to be 0.96 for this scale.

In identifying the construct validity of this scale, a factor analysis was employed, the KMO was found to be 0.880, and the result of Bartlett's test was $X^2 = 2724,096$,

and $P < 0.001$. The construct validity of the scale was determined using the principal component and Varimax rotation methods. The eigenvalues were accepted as 1 and above to detect the most suitable structure and the number of factors. The explained variance was determined as 15.7%, 12.7%, 12.2% and 9.9% for the subscales respectively. The total rate of the explained variance was 50.7%.

As the conclusion of the CFA of this scale, it was determined that the factor values varied in a range from 0.57 to 0.85 in the initial factor, from 0.50 to 0.85 in the second one, from 0.42 to 0.74 in the third one, and from 0.27 to 0.65 in the last one. The indices of model fit were determined as $X^2 = 759.13$, $X^2/df = 2,207$, RMSEA at 0.07, GFI (Goodness of Fit Index) at 0.80, CFI (Comparative Fit Index) at 0.83, NFI (Normal Fit Index) at 0.73, IFI at 0.83, df = 34 and $P < 0.001$ [Figure 1 and Table 2].

Table 1: Demographic and Obstetric Characteristics (*n*=221)

Introductory and Obstetric Characteristics	min	max	x̄	SD
Age	20	45	33.00	5.701
Monthly mean income (Euro)	800	15000	2312.80	1474.627
Gestational week	27	41	34.34	3.122
Number of pregnancy	1	7	2.88	1.483
Number of birth	0	5	1.20	1.035
Number of abortions	0	4	0.55	0.833
Number of curettage	0	4	0.13	0.460
Number of ectopic pregnancy	0	1	0.01	0.116

			n	%
Educational Status				
Literate			24	10.9
Primary School			107	48.4
High School			58	26.2
University and above			32	14.5
Occupational status				
Working woman			55	24.9
Housewife			166	75.1
Treatment method				
Diet treatment			117	52.9
Insulin treatment			104	47.1

Table 2: Confirmatory Factor Analysis of SRAHP

Fit index	Index values	Acceptable values
X^2/df	2,207	≤3
GFI	0.80	≥0.85
IFI	0.83	≥0.90
CFI	0.83	≥0.90
RMSEA	0.07	≤0.08

Note: CFI=comparative fit index; GFI=goodness of fit index; IFI=incremental fit index; RMSEA=root mean square error of approximation

Reliability analysis

SRAHP scale's reliability analysis was conducted by taking into account the following factors: (1) item-total correlations; (2) item-subscale total score; (3) Cronbach's alpha coefficient; (4) split-half reliability test. The item total score and correlations in this scale were determined to be varying between 0.25 and 0.68. The correlations of the items with the subscale scores varied between 0.36 and 0.83 for the SRAHP [Table 3].

Cronbach's alpha total-coefficient value in this scale was determined to be 0.91, and the alphas were calculated as 0.88, 0.83, 0.80, and 0.68 for subscales, respectively [Table 4]. Additionally, the split-half reliability test results were demonstrated in Table 4.

DISCUSSION

The psychometric properties that forming the touchstone of the GDM management in the SHARP scale are important for health practice. Therefore, a Turkish adapted version of the SHARP scale was evaluated as valid and reliable scale and this scale will provide opportunity for evaluation abilities of health practices in women with GDM diagnosis.

Validity

The present results revealed the content validity of the scale, and the suitability of the scale items concerning the Turkish culture. The Content Validity Index (I-CVI) and the Content Validity Index (S-CVI) values are used for the suitability of the scale items.[14] The values of the I-CVI and S-CVI must be over 0.80.[23,24]

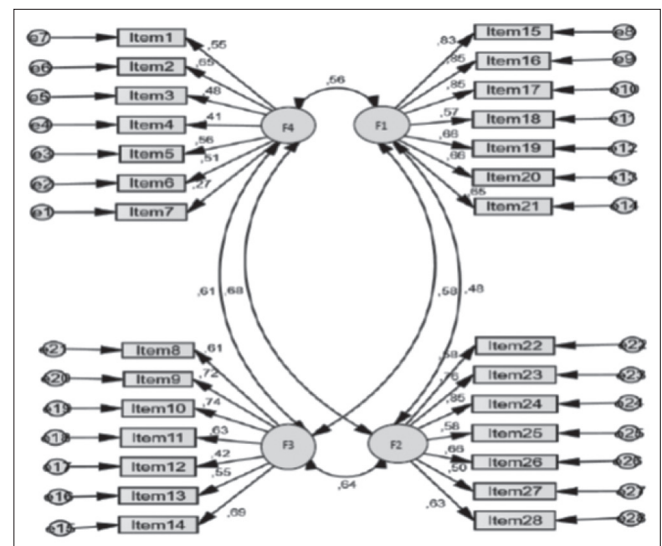In this study, the values for the SRAHP scale demonstrated that the sample size was appropriate to conduct both

Figure 1: SRAHP confirmatory factor analysis. Chi-square = 759.13, df = 34, RMSEA = 0.074, $P < 0.001$

Table 3: Item-total Correlation of the SRAHP

Subscales	Items	Item-total correlation (r)*	Item-subscale score correlations (r)*
Factor 1 Exercise			
	Item 15	0.672	0.809
	Item 16	0.669	0.817
	Item 17	0.685	0.831
	Item 18	0.573	0.695
	Item 19	0.662	0.755
	Item 20	0.560	0.755
	Item 21	0.639	0.740
Factor 2 Responsible Health Practices			
	Item 22	0.638	0.650
	Item 23	0.593	0.731
	Item 24	0.627	0.813
	Item 25	0.479	0.653
	Item 26	0.539	0.757
	Item 27	0.532	0.652
	Item 28	0.533	0.717
Factor 3 Psychological Well Being			
	Item 8	0.603	0.657
	Item 9	0.567	0.759
	Item 10	0.578	0.746
	Item 11	0.506	0.680
	Item 12	0.422	0.556
	Item 13	0.464	0.653
	Item 14	0.650	0.751
Factor 4 Nutrition			
	Item 1	0.470	0.563
	Item 2	0.521	0.658
	Item 3	0.455	0.611
	Item 4	0.398	0.598
	Item 5	0.536	0.712
	Item 6	0.470	0.578
	Item 7	0.255	0.369

*Significant at *P*<0.001 level

Table 4: Reliability Analysis of the SRAHP

Subscale	Cronbach α	Spearman-Brown Coefficient	Guttman Split-Half Coefficient	N of items
Factor 1 Exercise	0.88	0.85	0.83	7
Factor 2 Responsible Health Practices	0.83	0.76	0.75	7
Factor 3 Psychological Well Being	0.80	0.76	0.75	7
Factor 4 Nutrition	0.68	0.71	0.70	7
Total	0.91	0.81	0.80	28

the distribution of homogeneity of values and the factor analysis. The KMO value is defined as "very good" when it is between 0.80 and 0.90.[24] Also, it is tested using Bartlett's sphericity test in order to determine whether the data followed a multivariate normal distribution.[25]

It was stated that in order to evaluate the self-efficacy of the women with GDM, the items showed a good distribution and they were in coherence with their factors. It was shown that sufficient rate of the explained variance (50.7%). In social sciences research, it is supposed to be sufficient to have an explained variance rate ranging from 40% to 60%.[14] Furthermore, if the total variance is high, the scale's construct validity is stronger.[14,20] Therefore, we did not remove any item from the original scale. The total explained variance was evaluated by Becker *et al*., (1993)[17] as 61% for the four subscales, on the original scale. Explanation of the self-efficacy concept evaluated by items and factors that supporting the construct validity of the scale will provide reliable data for the application area. It will facilitate to evaluate both clinical evaluation and future

research results. For this reason, it is important to explain whether the concepts of items and factors have been correctly evaluated.

As the result of the research, the factor load of the item *'Each day, I drink sufficient amunt of water for my needs'* was below the desired value (factor load is 0.25). On the contrary, in the original study where the scale was developed, it was explained that the factor loadings were above 0.40.[17] According to the literature, the factor loads must be 0.30 and above and items with a factor load below this value should be removed from the scale.[24] However, it was thought that the decrease in the factor load of the substance was due to the increase in water consumption of diabetic pregnant women. It was decided not to remove the item in order not to change the original scale's structure and the nature of the study group. Although the scale was used in a different group, the belief that water consumption is an important parameter in evaluating the self-efficacy required for the development and maintenance of health was influential in this decision.

In the results of current study, it was shown that the data were consistent with the model, the scale confirmed the factor structure, and the factors were related with the obtained values. Concerning the results of the confirmatory factor analysis, it was recommended that the RMSEA should be less than 0.08, the X^2/df value should be less than 5, and the other fit indices should be above 0.90.[26] There is no single compliance criterion for determining the significance of the model. Many compliance index values need to be evaluated.[26] The results of the research were interpreted based values on literature because the original scale was not yet adapted to a different culture and different sample group. It was concluded that scale is valid and can be used in clinical practices to determine the self-efficacy levels of pregnant women with GDM concerning the changes in their lifestyles.

Reliability

The total score of this scale and the correlations of the items ranged between 0.25 and 0.68. In addition, the total score of the subscales and item correlations were between 0.36 and 0.83. Correlation coefficients of the scale items were positive, high, and statistically significant. A high item-total correlation determines that items exemplify similar behaviors.[15] This value should be positive and higher than 0.20 or 0.25.[22] The present scale had good item reliability to measure self-efficacy beliefs in order to perform health promotion practices for the women with GDM. This points that this scale may be useful in evaluating, problem solving, following, counseling, and supporting the adoption of health behaviors.

Similar to those of the original study, Cronbach's alpha coefficients of translated SRAHP scale for pregnant women with GDM was 0.91; this figure is quite close to the initial SRAHP Cronbach's alpha coefficient of 0.94.[17] Similar results were obtained in the study conducted with a similar sample. In the study, that the effectiveness of education given to women with GDM were evaluated, the Cronbach's alpha coefficients of the SHARP scale were calculated between 0.77 and 0.94.[27] It is a natural finding that mothers think about the health of their babies during the pregnancy process. Therefore, most of them try to be more careful. The Cronbach's alpha coefficient showed that items evaluate the same features and are appropriate in assessing the confidence of performing health practice in GDM. As the conclusion, the SRAHP scale had satisfactory reliability.

The split-half reliability is another method to evaluate the internal reliability of the scale.[15] The Spearman-Brown Coefficient and Guttman Split-Half Coefficient could not be compared to the original study since it did not include this result. But, the Turkish version of the scale had high internal reliability in this study.

Strengths and limitations of study

In the results of current study is shown that Turkish culturally adapted version of the SHARP. The SHARP scale is use to evaluate education programs based on self-efficacy that are planned to promote lifestyle changes in women with GDM. In this way, the effectiveness of the education offered can be evaluated objectively and easily and practically.

There are certain limitations in this study as well. First, test-retest analysis was not applied since there was a limited period for gestation. In addition, although the sample size is sufficient for analysis, it may not be possible to generalize. In order to provide the generalizability of the scale, it is recommended to conduct studies in the same population, different regions and with a larger number of samples.

CONCLUSION

The scale can be used to determine self-efficacy levels in the health practices of GDM management. It would also be beneficial to consider suitable nursing interventions in enhancing the efficiency levels of women, who have low levels of self-efficacy. Because it is important to develop self-efficacy in order to maintain GDM management that will effective in preventing complications. Women who, protecting their health, will improve the country's health system and contribute to the country's economy. It can also be used in intercultural studies, manifesting the importance

of the use of a valid and reliable instrument through adaptation of the scale in Turkish.

Conflicts of interest

There are no conflicts of interest.

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