Original Article

The Turkish Validity and Reliability Study of the Risk Perception Survey-Diabetes Mellitus Scale

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Abstract

Objective: The aim of this study is to check the validity and reliability of the Turkish version of the Risk Perception Survey-Diabetes Mellitus Scale.
Method: This is a methodological study. The linguistic equivalency of the scale was achieved and expert views were taken for context validity. The reliability of the scale was determined through test retest reliability, item total score correlations, and internal consistency analyses. Exploratory factor analysis for structural concept validity and Basic Components Analysis and Varimax rotation for factor structure examination were used.
Results: As a result of the factor analysis, five factors explaining 69.14% of the total variance were obtained. As a result of the factor analysis, the item number of the scale decreased from 31 to 25. The factors were respectively named risk knowledge, worry, optimistic bias, personal disease risk and environmental risk. Cronbach alpha internal consistency coefficients of the RPS-DM were found to be 0.76 for the risk information sub dimension, 0.83 for the worry sub dimension, 0.91 for the optimistic bias sub dimension, 0.89 for the personal disease risk sub dimension, and 0.92 for the environmental risk sub dimension. For each item of the scale, the test retest correlation coefficients were found to vary between 0.58 and 0.68.
Conclusion: It was found that the Turkish form of the scale, which consisted of 25 items and five sub dimensions, was a valid and reliable scale that could be used to examine the risk perception levels of individuals with diabetes regarding diabetes complications.

Key Words: Diabetes, risk perception, scale, validity, reliability.

Introduction

Because of the unforeseen rate of increase in case numbers, the high rates of mortality and morbidity, and the increased socio economic load it causes, diabetes has become the most discussed chronic and widespread metabolic disease in Turkey and throughout the World to which the most effort towards solutions is made (Uysal & Acpinar, 2013). Whether under treatment or not, acute and chronic period damage in various systems, organs, or tissues may occur in all diabetes patients when blood glucose levels are not under control. For this reason, the prevention of diabetes complications is as important as the treatment of diabetes itself (Uludag, 2010).

For efficient disease management, the prevention of complication development, and the continuity of quality of life, individuals with diabetes are expected to form a new lifestyle from the

moment they receive the diagnosis. In the adaptation of individuals with diabetes, their risk perception regarding the disease is important (Kim et al., 2007; Rovner et al., 2014; Rouyard et al., 2016). Risk perception, which is related to the identity of the disease (being acute or chronic, the phase of the disease, symptoms), the social importance of the disease, adaptation to the disease (the individual perceiving the disease), self-care behavior, and treatment experiences (Shreck et al., 2014), constitutes one of the most important elements of healthy behavior theories (Hivert et al., 2009). A high level and correct risk perception can encourage healthy lifestyle behavior such as healthy nutrition and sufficient physical activity (Kim et al., 2007).In studies in the literature, risk perception regarding the disease and complication development in individuals with diabetes was found to affect well-being (Calvin et al, 2011), adaptation to diets, exercise, and medication (Shreck et al., 2014), and self-management behavior (Scollan-Koliopoulos, Walker & Bleich, 2010; Wattanakul, 2012) beside being related to mood disorders (Kausar, Awan & Khan, 2013) and depression (Rovner et al., 2014). In this context, it is important to evaluate risk perception regarding the disease and complications in individuals with diabetes to encourage positive behavior and adaptation to treatments (Rauyard et al., 2016). Additionally, the information on risk perception is also necessary for the management of programs on complication prevention (Soltanipour, Heidarzadeh & Jafarinezhad, 2014).

Despite those studies in the international field, there are no measurement tools in Turkey specific to individuals with diabetes used to determine risk perceptions regarding the disease and its complications. This study was thought to contribute to raising awareness on the risk perception of individuals with diabetes regarding complication development and to introducing a valid and reliable scale for such studies integrated into the Turkish language to the health professionals in our country in tutoring and research roles. Additionally, evaluating risk perception in individuals with diabetes and reflecting this to the treatment and education plans of patients was predicted to provide benefits in bringing diabetes under control and protection from complications.

This study was conducted to test the language equivalency, validity, and reliability of the Risk Perception Survey–Diabetes Mellitus (RPS-DM) and adapt it for the Turkish society.

Methods

Study Design and Sample

It is a methodological study. The universe of the study consisted of individuals with diabetes who presented at the Diabetes Polyclinic of a university hospital in the city of Istanbul between June 1st 2015 and February 26th 2016. Individuals, who were diagnosed with diabetes at least 6 months ago, were 18 years of age and above, at least literate, had no verbal communication disabilities because of disorders in hearing, understanding, or speech, and agreed to participate in the study were included in the sample.

In order to perform factor analysis in scale studies, the sample size is suggested to be at least 5 to 10 times the number of items in the scale (Tavsancil, 2014). In this context, the number of items in the scale was multiplied by 5 (31 x 5) and the study was completed with a sample consisting of 161 individuals. The individuals in the sample were selected through random sampling.

Data Collection Tools

Data was collected using a patient identification form and the Risk Perception Survey-Diabetes Mellitus (RPS-DM).

The Patient Identification Form; This form consisted of 30 items questioning socio demographic characteristics (age, height, weight, sex, marital status, education, occupation, economic status, smoking stats, alcohol use etc.), disease related characteristics (disease duration, diabetes type, presence of other chronic conditions, treatment type, regular use of medication, presence of complications etc.).

The Risk Perception Survey–Diabetes Mellitus (RPS-DM); The scale was developed in 2007 by Elizabeth A. Walker and tested for validity and reliability (Walker et al., 2007). It is the first measurement tool to measure information on the complications of diabetes and risk perception. The scale can be applied to individuals at or above 18 years of age diagnosed with diabetes type I or II. However, the validity and reliability study of the original form of the scale was performed with the participation of 250 individuals with diabetes with a mean age of 56.5 ± 12.2. The scale is a self-report scale with

31 items that is easy to complete. Items 8,9,10,11,12, and 13 are scored inversely on the scale. The scale has 2 sub dimensions, namely risk knowledge and composite risk. These sub dimensions are evaluated separately in the scale and the total score from the scale is calculated through their total. The scores of the sub dimensions are calculated through dividing the total score by the number of items in the sub dimension.

- **Risk knowledge:** This is the 3 way likert type first section of the scale with 5 items. Each question has a single answer and correctly marked items are awarded 1 point. The answer to the relevant question in this sub dimension is either "high risk", "no risk", or "low risk". In this sub dimension, which can be scored between 0 and 5, higher scores indicate better levels of knowledge regarding the complications of diabetes. In a study by Walker et al (2007), the cronbach alpha value of the risk knowledge sub dimension was found to be 0.64.

- **Composite risk perception:** This includes the 26 item section apart from the risk knowledge level. A 4 way likert type scoring is used for the measurement of each item Higher scores indicate higher perceived risk levels on the complications of diabetes. The composite risk perception sub dimension consists of 5 sections. The cronbach alpha value of the composite risk perception dimension was found to be 0.85.

- **Perceived personal control:** This sub dimension evaluates the perceptions of the individual regarding the development of diabetes complications. Each item is answered as "I certainly agree (1)", "I agree (2)", "I do not agree (3)", or "I certainly do not agree (4)". The score value of the section varies between 1 and 4. Higher scores indicate less risk perception and more perceived control. The cronbach alpha value of this sub dimension was found to be 0.65.

- **Worry:** This sub dimension questions worry regarding diabetes causing health problems and complication development. Each item is answered as "I certainly agree (1)", "I agree (2)", "I do not agree (3)", or "I certainly do not agree (4)". The score value of the section varies between 1 and 4. Higher scores indicate higher levels of worry. The cronbach alpha value of this sub dimension was found to be 0.64.

- **Optimistic bias:** This sub dimension evaluates the belief that complication development will be less compared to individuals

in the same age and gender group. Each item is answered as "I certainly agree (1)", "I agree (2)", "I do not agree (3)", or "I certainly do not agree (4)". The score value of the section varies between 1 and 4. Higher scores indicate higher optimism while lower scores indicate more pessimism. The cronbach alpha value of this sub dimension was found to be 0.76.

- **Personal disease risk:** This sub dimension includes 9 items on diseases or health problems. Each item is answered as "I certainly agree (1)", "I agree (2)", "I do not agree (3)", or "I certainly do not agree (4)". Additionally, the presence of diseases or health problems in the individual is designated as "yes" or "no" and an additional point is assigned for each "yes" answer. The score value of the section varies between 1 and 5. Higher scores indicate higher personal disease risk perception. The cronbach alpha value of this sub dimension was found to be 0.86.

- **Environmental risk:** This sub dimension questions risks caused by potential dangers in the environment. Each item is answered as "Almost no risk (1)", "mild risk (2)", "medium risk (3)", or "High risk (4)". The score value of the section varies between 1 and 4. Higher scores indicate higher perceived environmental risk levels. The cronbach alpha value of this sub dimension was found to be 0.83 (Walker et al., 2007).

The language equivalency of the Risk Perception Survey-Diabetes Mellitus

The language equivalency of the scale was ensured through translation and back translation. For this reason, first the scale was translated to Turkish by two nursing academicians and another academician who completed their graduate English education. The three translations at hand were evaluated by the researchers and an expert on Turkish linguistics and literature, the most appropriate terms for each item were determined, and a single translation was obtained. Then, the Turkish final form of the scale was given by another linguistics expert who understood both languages, and the scale was back translated into English. The items in the original scale and the back translated scale were compared and material that was not appropriate was reviewed.

Thus, whether there was any variance in meaning between the Turkish form of the scale and the

original scale was evaluated and linguistic equivalency was achieved.

A pilot study was performed to decide on the clarity and understandability of scale items and to test the reliability of the scale by calculating its internal consistency. For this reason, the pilot study of the scale was performed with 20 individuals with diabetes and the individuals were asked their opinions on the items and whether the items could be understood or not. Since there was no negative feedback, it was decided that the Turkish form of the scale was applicable. Data from the individuals who participated in the pilot study was not included in the study.

The context validity of the Risk Perception Survey-Diabetes Mellitus

For the context validity of the scale, expert views were taken. For this reason, the Turkish form of the scale was presented to the views of 6 nursing academicians who have publications on diabetes and offer education on the topic. In order to evaluate expert views, the Content Validity Index- CVI was used (Gözum ve Aksayan 2003). The experts were asked to make evaluations by scoring the items according to how appropriate they were as 1 point: not appropriate, 2 points: somewhat appropriate (the item and term needs to be reformed), 3 points: appropriate with need for small changes, or 4 points: very appropriate. In the evaluation, 80% of scale items were expected to have scores between 3 and 4 (Yurdugul, 2005). All of the experts gave each item on the scale 4 points. Through this study, the context validity of the scale was accepted.

Data collection

Data was collected by the researchers through face to face interviews in an environment where an interview could be conducted comfortably. The researchers informed the participants on the aim and importance of the study and the data collection tools were applied to the individuals who agreed to participate in the study. The completion of the study forms by each individual took approximately 25-30 minutes.

Data evaluation

For the evaluation of study data, the IBM SPSS Statistics 22 and SPSS AMOS 22 (IBM SPSS, Turkey) programs were used. The compliance of variables with normal distribution was evaluated using the Shapiro Wilks test and the variables were found not to comply with normal distribution. Descriptive statistical methods (mean, standard deviation, frequency) were also used in data evaluation. Before the structural validity factor analysis of the scale, the Kaiser-Meyer-Olkin (KMO) and the Bartlett Sphericity Test were performed. Exploratory factor analysis (EFA) for the validity of the scale was performed, as well as Confirmatory Factor Analysis (CFA) for structural validity. In the reliability analysis, Cronbach alpha analysis for internal consistency and the Spearman Rho correlation for item total score correlation were used. For test retest reliability, the Intraclass Correlation Coefficient (ICC) was used. The level of statistical significance was determined as below 0.05 in al tests, and the results were evaluated at an alpha 95% confidence interval in two ways.

Ethical considerations

Before the study, written permission from Elizabeth A. Walker was taken via e mail for the Turkish adaptation of the RPS-DM and the performance of the validity and reliability studies of the scale with Turkish diabetes patients. Additionally, written permission from the ethics board of a university was taken for the study (Decision no:2015-05/01). The study was conducted in accordance with the ethical standards of the Helsinki declaration.

Results

The mean age of the individuals with diabetes was 49.06±15.86 and 68.9% were female. More than half (72.0%) of the individuals were married, 41.6% were high school graduates, and 39.8% were housewives.

The mean disease duration of the participants was 13.19±8.34 years and their mean HbA1C value was %7.37±1.45. 63.4% of the individuals had type II diabetes and 57.1% had another chronic disease as well. 39.7% of the individuals used insulin for diabetes treatment and most (90.7%) regularly used the suggested treatment. Only 46.0% of the individuals with diabetes followed their diet and only 40.4% regularly exercised. 59.6% of the participants presented at a health institution once every three months for diabetes checkups, and 6.8% had at least one hospitalization in the last year because of diabetes or its complications.
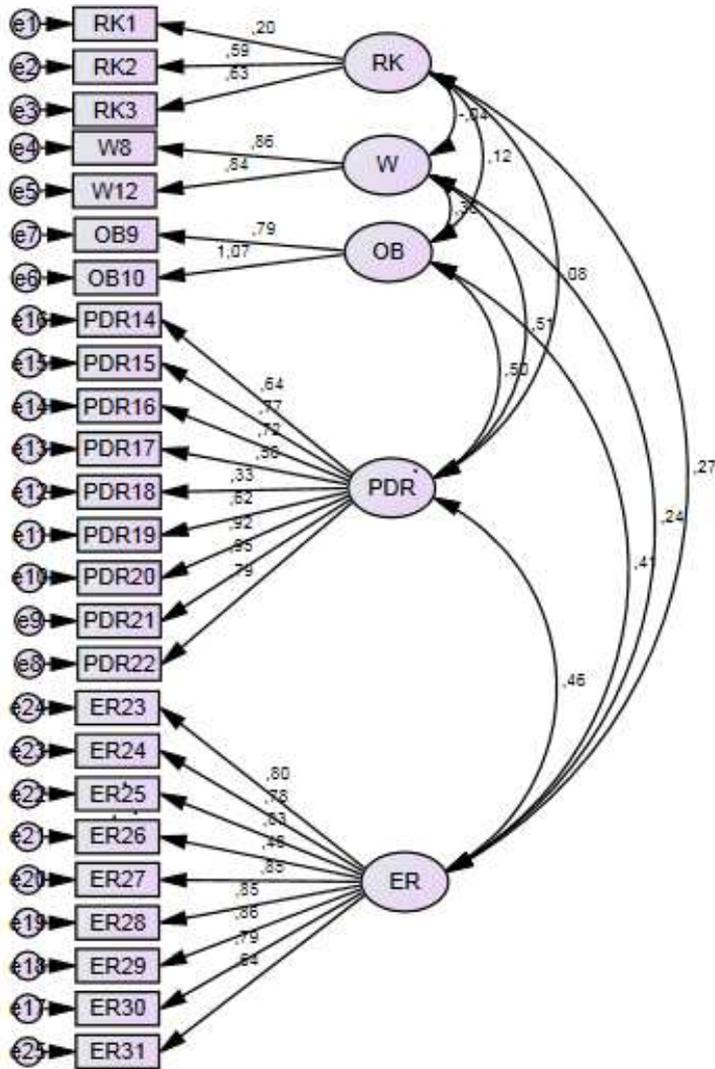
Figure 1. The path diagram of the confirmed model (Standardized Estimates)

Table 1. The Mean and Total-Item Correlations of the Scale Items

Item no.	Min-Max	Mean±SD (Median)	Anti-Image Correlation	Item-Total Correlation	Cronbach Alpha when substance is cleared
1	1-3	1.26±0.62 (1)	0.555	0.315	0.876
2	1-3	2.84±0.45 (3)	0.717	0.358	0.873
3	1-3	2.89±0.44 (3)	0.586	0.385	0.872
4	1-3	2.86±0.45 (3)	0.541	0.320	0.873
5	1-3	1.26±0.60 (1)	0.682	0.317	0.873
6	1-4	2.69±0.65 (3)	0.657	0.324	0.876
7	1-4	2.89±0.55 (3)	0.443	0.327	0.875
8	1-4	2.89±0.76 (3)	0.802	0.367	0.869
9	1-4	2.52±0.68 (3)	0.655	0.383	0.882
10	1-4	2.49±0.69 (3)	0.766	0.524	0.885
11	2-4	3.05±0.46 (3)	0.488	0.340	0.873
12	1-4	2.88±0.73 (3)	0.739	0.338	0.870
13	1-4	3.23±0.60 (3)	0.703	0.375	0.871
14	1-4	2.20±1.06 (2)	0.855	0.427	0.868
15	1-4	1.69±1.00 (1)	0.931	0.660	0.862
16	1-4	1.50±0.92 (1)	0.906	0.680	0.862
17	1-4	2.35±1.15 (3)	0.927	0.511	0.866
18	1-4	2.66±1.33 (3)	0.734	0.161	0.878
19	1-4	2.04±1.15 (2)	0.872	0.463	0.867
20	1-4	1.54±1.03 (1)	0.868	0.717	0.860
21	1-4	1.55±1.04 (1)	0.862	0.762	0.859
22	1-4	1.84±1.19 (1)	0.901	0.650	0.861
23	1-4	1.70±1.04 (1)	0.908	0.607	0.863
24	1-4	1.53±1.04 (1)	0.845	0.468	0.867
25	1-4	1.64±0.93 (1)	0.913	0.694	0.861
26	1-4	1.50±0.76 (1)	0.856	0.448	0.868
27	1-4	1.88±1.33 (1)	0.846	0.664	0.860
28	1-4	1.73±0.96 (1)	0.913	0.710	0.861
29	1-4	1.70±1.05 (1)	0.826	0.684	0.861
30	1-4	1.73±0.86 (1)	0.841	0.607	0.864
31	1-4	1.93±1.18 (1)	0.915	0.571	0.864

Table 2. Results of the Exploratory Factor Analysis of the Scale

Item no.	Substance load values by factors				
	Factor 1	**Factor 2**	**Factor 3**	**Factor 4**	**Factor 5**
2	0.093	0.026	**0.678**	-0.054	0.041
3	0.085	0.039	**0.892**	0.064	-0.048
5	0.051	-0.041	**0.929**	0.026	-0.009
8	0.102	0.275	0.006	0.119	**0.845**
9	0.127	0.222	-0.016	**0.910**	0.094
10	0.260	0.307	0.010	**0.835**	0.159
12	0.052	0.301	-0.052	0.093	**0.862**
14	-0.031	**0.808**	-0.097	-0.004	0.040
15	0.226	**0.779**	0.066	0.102	0.159
16	0.371	**0.679**	-0.033	0.058	0.146
17	0.196	**0.582**	0.152	0.164	0.094
18	-0.215	**0.548**	-0.027	-0.079	0.187
19	0.041	**0.733**	-0.005	0.081	0.049
20	0.245	**0.809**	0.007	0.214	0.139
21	0.302	**0.809**	-0.008	0.249	0.134
22	0.242	**0.733**	0.064	0.198	0.107
23	**0.822**	0.106	0.078	0.127	-0.090
24	**0.847**	-0.108	0.036	0.022	-0.031
25	**0.823**	0.170	0.049	0.139	0.144
26	**0.424**	0.089	0.161	0.329	0.386
27	**0.848**	0.159	0.064	0.045	-0.042
28	**0.842**	0.186	0.060	0.080	0.149
29	**0.838**	0.163	0.088	0.084	0.045
30	**0.775**	0.140	0.032	0.102	0.085
31	**0.639**	0.230	0.018	0.071	0.141

Table 3. The Fit Index Criterion Values and Evaluations on the Analysis Values

	Compliance Index Criterion Values	**Pre-modification DFA**	**Post-modification DFA**
NC (χ^2/sd)	≤ 2.5= perfect fit	2.245	2.270
RMSEA	≤ 0.05= perfect fit	0.088	0.089
CFI	≥ 0.90= good fit	0.827	0.870
NFI	1= perfect fit	0.730	0.792
GFI	≥ 0.90	0.726	0.773

Table 4. The Score Distributions of the Scale Sub Dimensions and Their Internal Consistency

Sub dimensions	Number of items	Range of obtainable scores (min-max)	Mean±SD	Cronbach Alpha
Risk Knowledge	3	0-3	2.73±0.70	0.767
Composite risk perception	22	1-4.40	2.28±0.38	0.885
Worry	2	1-4	2.88±0.68	0.839
Optimistic Bias	2	1-4	2.50±0.65	0.914
Personal Disease Risk	9	1-5	2.06±0.84	0.898
Environmental Risk	9	1-4	1.70±0.80	0.923

Table 5. The Test Retest Reliability of the Scale Sub Dimension and Total Scores (n=39)

Sub dimensions	ICC	%95 GA		p
		Lower limit	Upper limit	
Risk Knowledge	0.602	0.242	0.792	0.003**
Composite risk perception	0.580	0.199	0.780	0.004**
Worry	0.613	0.263	0.797	0.002**
Optimistic Bias	0.538	0.120	0.758	0.011*
Personal Disease Risk	0.562	0.165	0.770	0.006**
Environmental Risk	0.685	0.399	0.835	0.001**

ICC: Intraclass Correlation Coefficient   CI: Confidence Interval   *p<0.05   **p<0.01

The item analysis of the Risk Perception Survey-Diabetes Mellitus

The results pertaining to the item analysis of the scale were given in Table 1. The item total score correlations of the scale items were found to vary between 0.31 and 0.76. Generally, the correlation values of all items within the anti-image correlation matrix were found to be over 0.50. The Cronbach alpha value of the scale was found to be 0.87. When the items which had less than 0.50 item total score correlation were removed from the scale, no serious increase in the Cronbach alpha coefficient of the scale was observed. Thus, it was decided to remove no items from the scale.

The structure-concept validity of the Risk Perception Survey-Diabetes Mellitus

The Kaiser-Meyer-Olkin (KMO) sample sufficiency value of the scale was found to be 0.85. This showed that the sample was sufficient. The result of the Bartlett test (χ2=2876.519; df=300, p=0.001) was found to be significant.

This showed that the data group was appropriate for factor analysis.

In order to test the structural validity of the scale, an Exploratory Factor Analysis (EFA) was performed. For factor analysis, Basic Components Analysis and the Varimax Rotation approach were used. During exploratory factor analysis, the factor weight loads of 6 items were found to overlap and have low values. Additionally, these items didn't comply with the factors in the original scale. For this reason item 1 (being diagnosed with diabetes for more than 15 years), item 5 (having high blood pressure), item 6 (I feel that I have little control over risks to my health), item 7 (If I am going to get complications from diabetes, there is not much I can do about it), item 11 (My own efforts can help control my risks of getting diabetes complications), and item 13 (If I make a good effort to control the risks of diabetes complications, I am much less likely to get complications) were removed from the scale. As a result of the exploratory factor analysis performed on the remaining 25 items, the items

in the scale were gathered under five factors. The first factor explained 23.96% of the total variance, the 1st and 2nd factors explained 45.06% together, the 1st, 2nd, and 3rd factors explained 53.93% together, the 1st, 2nd, 3rd, and 4th factors explained 61.66% together, and all of the factors explained 69.114% of the total variance together.

In the last form, the factors obtained as a result of the exploratory factor analysis on the 25 items and the rotated component matrix showing the factors gathered under these 5 factors were given in Table 2.

Accordingly, the scale items gathered under 5 factors. In the original scale, the items had gathered under 6 factors.

Generally, the items gathered under the factors are parallel to the original scale. In the last form, the factor under which items 2,3 and 4 were gathered was named as the "Risk Knowledge" sub dimension, the factor under which items 8 and 12 were gathered was named as the "Worry" sub dimension, the factor under which items 9 and 10 were gathered was named as the "Optimistic Bias" sub dimension, the factor under which items 14, 15, 16, 17, 18, 19, 20, 21 and 22 were gathered was named as the "Personal Disease Risk" sub dimension, and the factor under which items 23, 24, 25, 26, 27, 28, 29, 30 and 31 were gathered was named as the "Environmental Risk" sub dimension. Since items 6,7,11 and 13 were removed, so was the "Perceived Personal Control" sub dimension.

The confirmatory factor analysis results of the Risk Perception Survey-Diabetes Mellitus

The Confirmatory Factor Analysis (CFA) for the scale was performed in two stages. Pre-modification CFA: In the first stage, evaluation was made based on the original form of the scale. The fit index values obtained showed that the data obtained from the sample did not have good fit with the model (Table 3). According to the results of the analysis, the values Normalized Chi squared (NC)=2.245, Comparative fit index CFI=0.827, Root Mean Square Error of Approximation (RMSEA)=0.088, Normalized Fit Index (NFI)=0.730 and Good Fit Index (GFI)=0.726 were found.

Accordingly, the model was found not to have good fit. In order to improve the fit of the model, certain items were removed from the scale according to their modification indices.

Post-modification CFA: In order to increase the fit of the model used pre modification, the modification indices were examined and, through additionally taking the findings of the exploratory factor analysis into account, items 1, 5, 6, 7, 11 and 13 were removed from the scale.

According to the results of the analysis post modification, the values Normalized Chi squared (NC)=2.270, Comparative fit index CFI=0.870, Root Mean Square Error of Approximation (RMSEA)=0.089, Normalized Fit Index (NFI)=0.792 and Good Fit Index (GFI)=0.773 were found. After the modification, the mode was found to have better fit according to fit indices (Figure 1).

The internal consistency results of the Risk Perception Survey-Diabetes Mellitus

The Cronbach alpha internal consistency coefficients of the 25 item (after the removal of 6 items) RPS-DM were found to be 0.76 for the risk information sub dimension, 0.83 for the worry sub dimension, 0.91 for the optimistic bias sub dimension, 0.89 for the personal disease risk sub dimension, and 0.92 for the environmental risk sub dimension (Table 4).

The time invariance of the Risk Perception Survey-Diabetes Mellitus

In order to collect the data for the test retest application, which would show the time invariance of the Turkish scale, the scale was applied a second time four weeks later to a group of 39 people selected from among the sample. Before the second interview, the patients were contacted via phone and invited to the institution for interviews.

The Intraclass correlation coefficient was calculated. Accordingly, the Intraclass correlation coefficients of the sub dimensions were found to vary between 0.58 and 0.68 (Table 5)

Discussion

While developing a scale or adapting it to Turkish, the application of validity and reliability studies constitute basic psychometric efforts (Gozum & Aksayan, 2003). It is not appropriate to use a measurement tool that cannot make valid and reliable measurements or one that makes correct measurements without serving its main goal.

The validity of the Risk Perception Survey-Diabetes Mellitus

The validity of a data collection tool can be tested through context validity, criterion validity, or structural validity (Erefe, 2002). If a measurement tool is being adapted to Turkish, first the linguistic equivalence of the scale should be ensured. In this study, when the evaluation scores of the experts were evaluated during the linguistic equivalence process, it was seen that there was no statistical difference between the scores and that the experts were in compliance. The scale, which was corrected according to expert views, can be considered appropriate for its measurement goal and representative of the field it aims to measure.

In the effort to adapt the Risk Perception Scale-Diabetes Mellitus into Turkish, confirmatory factor analysis was performed to confirm the compliance of factors for structural validity. In this analysis, fit indices were examined. The results of the widely used fit indices Normalized chi squared, RMSEA, GFI, CFI and NFI were reported in this study (Simsek, 2007). In confirmatory factor analysis, the fit indices need to be on a desired level. When the results were examined in the study, the original structure of the scale was found not to exhibit sufficient fit in the first phase. After the modification performed by removing 6 items, the model was found to show better fit according to fit indices. The results of this study showing differences from the original scale may be caused by the studies being conducted in different cultures.

The reliability of the Risk Perception Survey-Diabetes Mellitus

The reliability of a measurement tool can be tested according to time invariance independent observer consistency, and internal consistency (Erefe, 2002). The internal consistency of measurement tools is a concept based on the tool consisting of independent units with a certain goal and that these are known within the whole and equal in weight. The concept that determines whether all of the units in a tool have the ability to measure the desired variable is reliability. The Cronbach alpha coefficient and item-total score correlation are two of the methods used to test the internal consistency reliability of a measurement tool (Erefe, 2002; Akgul, 2003; Gözum & Aksayan, 2003). The sufficiency level of item-total score correlations varies according to sources. There are sources that state it should

be at least 0.20 whereas the most widely accepted value is 0.25. The higher the correlation coefficient is, the better the reliability of the items will be (Akgul & Cevik, 2005). In our study, the factor weight loads of 6 items were found to be low during exploratory factor analysis. These items measure an important characteristic regarding risk perception on complications in individuals with diabetes. However, since those items were not used in our study, and since those items decreased reliability, it was found appropriate to remove the items from the scale. The item-total score correlations of the other items in the scale were found to be on sufficient levels.

Since the evaluation criterion of a scale is itself, it is very important for a scale to be internally consistent. The Alpha coefficients of a scale that consists of items highly related to each other become higher. The Cronbach alpha coefficient is a measure of the internal consistency and homogeneity of a scale. The higher the Cronbach alpha coefficients of a scale are, the more the scale is considered to consist of items that are consistent with each other and measure the elements of the same characteristic. In a likert type scale, a sufficient reliability coefficient should be as close to 1 as possible. In the literature, the item total score correlation coefficient being above 0.25 and the cronbach alpha reliability value being higher than 0.50 have been determined as the expected limit of the internal consistency of the scale (Sencan, 2005; Sut, 2009). In our study, the Cronbach alpha internal consistency coefficients of the 25 item (after the removal of 6 items) RPS-DM were found to be 0.76 for the risk information sub dimension, 0.83 for the worry sub dimension, 0.91 for the optimistic bias sub dimension, 0.89 for the personal disease risk sub dimension, and 0.92 for the environmental risk sub dimension. The Cronbach alpha values of the Turkish form of the scale were found to be higher than its English and Persian forms (Walker et al., 2007; Soltanipour, Heidarzadeh & Jafarinezhad, 2014). These results show that the Turkish form of the scale has high internal consistency similar to the English form.

In this study, to test the reliability of the scale, test-retest measurements with a four week interval were used to perform the method time invariance testing from the literature. A positive, strong, and statistically significant relationship between the measurements made with the scale

with a four week interval was found. All five sub dimensions of the scale, which was translated into Turkish, were found to be highly reliable with no time variance.

Study Limitations

Since the study was performed in a single public hospital with individuals with diabetes who presented within a limited time scope and agreed to participate in the study, the results can only be generalized for its own universe and this is an important limitation of the study.

Conclusions

In this study, where the validity and reliability of the Risk Perception Scale-Diabetes Mellitus was examined in a Turkish sample of individuals with diabetes, the fit indices of the original 31 item structure of the scale was found not to confirm the original scale structure. In this context, through eliminating the items showing low correlation with the whole of the scale and applying certain modification suggestions in the repeated confirmatory factor analysis, an acceptable level of fit was achieved. In the final form, the 25 item Turkish form of the scale with five sub dimensions was found to meet validity and reliability criteria on acceptable levels.

Since the scale was adapted to Turkish for the first time, it can be suggested that new structures should be explored through retesting with different populations and that the scale should be used to evaluate its current structure.

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