

Diabetes distress scale-17 implementation among patients with diabetes: Turkish validity and reliability study

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Abstract

Objective: To prove reliability and validity of the Turkish version of diabetes distress scale.

Methods: The cross-sectional study was conducted at Tepecik Training and Research Hospital, Izmir, Turkey, from July 2011 to February 2012, and comprised diabetics whose ages ranged from 25 to 86 years who voluntarily participated in the study. Descriptive statistics, exploratory and confirmatory factor analyses were used for reliability and validity evaluations. SPSS 21 was used for data analysis.

Results: Of the 165 patients, 87(52.7%) were women and 78(47.3%) were men. Overall, 32(19.4%) patients had normal weight, 52(31.5%) were overweight, 74(44.8%) were obese and 7(4.2%) were morbid obese. Mean age was 53.69±11.39 years. Mean score was 50.87±11.53 points (range: 23 to 84). As for distress distribution, 15(9.1%) patients had no problem (0-34 points), 141(85.5%) moderate (35-68 points) and 9(5.5%) had high (>68 points). Fasting blood glucose was higher than 200 mg/dl in 22(13.2%) patients.

Conclusion: Turkish diabetes distress scale-17 was found to be valid and reliable and had satisfying fit-index parameters.

Keywords: Diabetes, Distress, Validity, Reliability. (JPMA 66: 662; 2016)

Introduction

Diabetes Mellitus (DM) is a metabolic and endocrinologic disease originating from lack of insulin and/or impairment of effect or both.¹ It is a metabolic disorder with chronic progress,^{2,3} and causes complications in eyes, kidneys, nervous system, cardiac and vascular bed. Moreover, it could decrease life quality and life expectancy. Turkey is estimated to have more than six million diabetics. According to Turkish DM epidemiology research (TURDEP-II), the prevalence of DM was 13.7% and nearly 27% for the patients with impaired glucose tolerance (IGT) or pre-DM.^{4,5}

Preclinical DM risk factors include familial DM history, cardiovascular disease (CVD), excess weight (body mass index [BMI] ≥25kg/m²), sedentary lifestyle, previous impaired fasting glucose (IFG) and IGT, hypertension (HT) (≥140/90 mmHg), hypertriglyceridemia (≥250 mg/dl) and/or low high-density lipoprotein (HDL) (≤35mg/dl), gestational DM history, giving birth to a baby weighing 4kg or above, polycystic ovary syndrome (PCOS) and age over 45 years.^{6,7}

DM is an endocrinologic chronic disease with the psychosociological dimensions affecting all aspects of life.⁸ It has chronic complications causing serious morbidity and mortality, great cost to the patient and to

population, and negatively affects physical, psychological health and the inner vision of the patient.⁸ DM shows comorbidity with depression and anxiety disorders.^{3,9-21}

This current study was planned to prove the reliability and validity of the 17-item diabetes distress scale (DDS17) by exploring patients' distresses and insights.

Patients and Methods

The cross-sectional study was conducted between July 2011 and February 2012 in Tepecik Training and Research Hospital, Izmir, Turkey, and comprised DM patients. After permission from the institutional review board, the sample size was calculated at 95% confidence interval (CI) by "universe known sampling" formula.

Original English DDS17, constituted by Polonsky et al.,²² was adapted to Turkish language. The English text was translated into Turkish by two translators who had high grades in the English language proficiency examinations. The translated text was back-translated to English; level of accuracy was evaluated, the ambiguities were rechecked and adjustments were made.

Distress was calculated using 6-point Likert answers as follows: no problem (1, 2), medium (3, 4), and serious problem (5, 6). Patients participating in the study chose their convenient answers regarding their distress.

SPSS 21 was used for data analysis and for calculating internal consistency (reliability) Cronbach's alpha was used. Item-total correlation (rit) was used for content validity.

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Exploratory and confirmatory factor analyses were used for validity analyses. Sociodemographic data was analysed by chi-square test; $p < 0.05$ was considered significant.

Results

Out of the 165 patients, 87(52.7%) were women and 78(47.3%) were men. The overall mean age was 53.69 ± 11.39 years (range: 25-86 years), mean weight 82.71 ± 15.78 kg (range: 49-142), mean height 165.71 ± 11.46 cm (range: 72-194 cm); and mean body mass index (BMI) was

Table-1: Sociodemographic data of the study population.

Sociodemographic data		n	%
Gender	Female	87	52.7
	Male	78	47.3
Education level	Illiterate	15	9.1
	Primary school	69	41.8
	Secondary school	46	27.9
	High school	27	16.4
	University Graduate	8	4.8
Occupation	Housewife	76	46.1
	Retired	33	20.0
	Worker	22	13.3
	Other	34	20.6
Monthly income	313-625\$	52	31.5
	625-1250\$	28	17
	>1250\$	6	3.6
	Undetermined	19	11.5
	None	60	36.4

30.01 ± 6.05 kg/m² range: 18.93-68.82) (Table-1). Overall, 32(19.4%) patients had normal weight, 52 (31.5%) were overweight, 74 (44.8%) were obese and 7(4.2%) were morbid obese. Mean fasting blood glucose (FBG) was 149.26 ± 55.81 mg/dl (range: 88-440). It was higher than 200 mg/dl in 22(13.2%) patients. Mean scale answer score was 50.87 ± 11.53 points (SD) (range: 23-84). As for distress distribution, 15(9.1%) patients had no problem (0-34 points), 141(85.5%) had moderate (35-68 points) and 9(5.5%) high (>68 points). Mean Pearson's correlation coefficient was 0.267 ± 0.242 . The most frequent diseases relating to type 1 DM (T1DM) were: HT in 2(1.21%) patients, hyperlipidaemia (HL) in 2(1.21%) and no disease (only T1DM) in 2(1.21%); while those relating to T2DM were: HT in 38(23.03%) patients, HL in 32(19.40%), HT+HL in 63(38.18%), additional disease with/without HT and/or HL in 10(6.06%) and no disease (only T2DM) in 16(9.7%) patients.

Cronbach's alpha value was 0.823 and rit was 0.221 (range: -0.117-0.633). Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.781, and Bartlett's sphericity test was significant ($p=0.000$). These two results allowed us to do factor analysis of DDS17-Turkish scale. According to principal component analysis by varimax rotation with Kaiser Normalisation, the Eigen values over 1 were: 4.844, 2.186, 1.838 and 1.307. Four factors were found to constitute 59.9% of the total variance. Item no.1, 3, 8, 10, 14 and 16 constituted Factor1 explaining 28.5% of the total variance and it could be called 'emotional status'. Similarly, Factor 2

Table-2: Varimax rotated iterated principal exploratory factor analysis of DDS-17-Turkish.

	Factor 1 (Emotional status)	Factor 2 (Physician)	Factor 3 (Interpersonal stress)	Factor 4 (Regimen)	Σ Variance %
Variance %	28.5	12.9	10.8	7.7	59.9
Item3	0.775	0.173	-0.014	0.015	
Item14	0.763	0.149	0.243	0.015	
Item1	0.746	0.121	0.071	0.054	
Item8	0.729	-0.034	0.123	0.089	
Item10	0.618	0.062	0.221	0.135	
Item16	0.604	0.127	0.359	0.113	
Item9	0.000	0.801	0.256	-0.045	
Item2	0.093	0.758	0.156	-0.075	
Item4	0.313	0.756	0.054	0.014	
Item15	0.101	0.695	0.036	0.111	
Item13	0.271	0.173	0.804	0.077	
Item17	0.201	0.126	0.766	-0.051	
Item7	0.139	0.147	0.755	0.169	
Item6	0.013	-0.019	0.023	0.872	
Item12	0.157	-0.126	0.045	0.792	
Item5	-0.121	0.292	0.135	0.585	
Item11	0.216	-0.024	0.016	0.537	

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

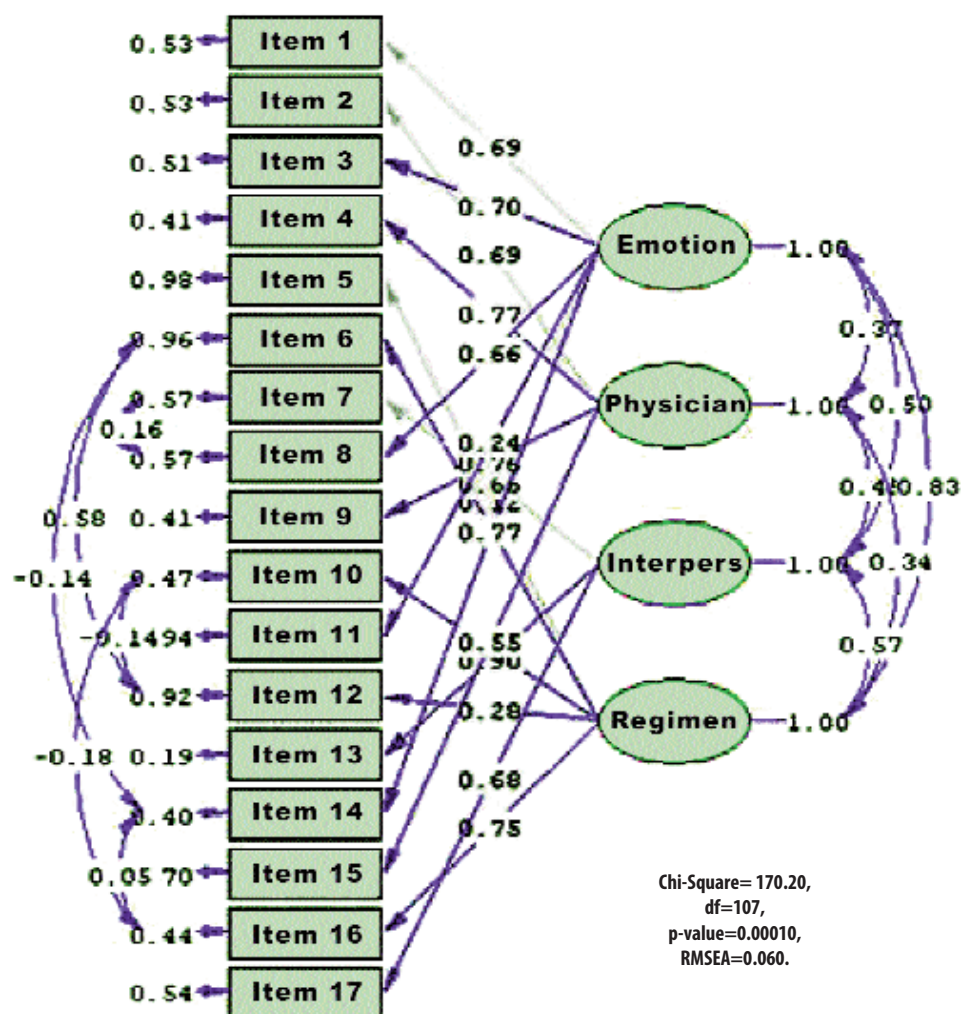


Figure: Confirmatory factor analysis model of the diabetes distress scale (DDS)-17-Turkish with correlated factors with permitted correlated errors. Boxes represent observed variables; Circles represent latent variables; Single headed arrows represent regression weights; Double headed arrows represent correlations.

(items 2, 4, 9 and 15; 'physician stress') explained 12.9%, Factor 3 (items 7, 13 and 17; 'interpersonal stress') explained 10.8%, and Factor 4 (items 5, 6, 11, 12; 'compliance to regimen') explained 7.7% of the total variance (Table-2).

For the confirmatory factor analysis, the goodness of fit index (GFI) was 0.89, normed fit index (NFI) 0.94, comparative fit index (CFI) 0.96, $\chi^2=170.2$, $df=107$, $\chi^2/df=1.59$, $p=0.0001$, root mean square error of approximation (RMSEA) =0.060. The values confirmed that DDS-17-Turkish had a good-fit statistics (Figure).

Discussion

The measurement instruments of the distress of DM patients make it possible to quantify the patient's opinion regarding their disease, satisfaction and accessibility in dealing with

this manner, and the treatment follows. However, in practice, there is a lack of reliable and sensitive measurement instruments. The adaptation of the present questionnaire was, in this aspect, very important, as it was an internationally-validated instrument that permitted us to make the comparison between different countries.

This study's demographic data corresponds to a DDS17 study performed by Fisher et al.²³ In this study, 52.7% of the participants were women and 47.3% were men with a mean age of 53.69 ± 11.39 . In Fisher et al.'s study, there were 57% women and 43% men with a mean age of 57.83 ± 9.86 . In the original DDS17 study of Polonsky et al., there were no differences between gender, ethnicity, education level, duration of DM and total DDS 17 score.²² However, in this study, gender was found statistically significant with total DDS 17-Turkish score ($\chi^2=4.459$, $df=1$, $p=0.030$) so that women had higher score than men. Monthly income was also found statistically significant with total DDS17-Turkish score ($\chi^2=16.99$, $df=8$, $p=0.030$).

In the original study mean DDS17 score was 38.5 against this study's 50.87 ± 11.53 . This could be due to lower monthly income, lower education level in Turkey and other stress factors (e.g. social security).

In this study, all women believed their DM would cause long-time serious health problems in the future ($p<0.05$). Obese patients trusted their physician for having enough knowledge of their illnesses ($p<0.05$). However, they believed they did not have enough emotional support from their families and friends ($p<0.05$).

Socioeconomic levels of the participants were lower while their mean FBG levels were higher than normal ($p<0.05$). Patients having high socioeconomic status thought they had

enough emotional support from their families ($p < 0.05$).

Patients with high FBG thought their illness would cause serious health problems for them. Depending on low level of socioeconomic status, higher level of basal BG could be found related with inexpensiveness of carbohydrate-based nutrition rather than protein-based nutrition.

In Citil et al.'s study, many factors like female gender, higher age, and lower education were affecting the HbA1c, long duration of DM, highness of BMI, additional chronic diseases.²⁴

The most co-existing diseases were HT and HL. Moreover, Onder et al.'s study has depicted that HT frequency was found twice in DM patients rather than non-DMones, which concurs with our study's results. Coexistence of HT and HL with DM could be found related with metabolic syndrome prevalence in Turkish people because its frequency was 28% in men and 40% in women.²⁵

No occupational factor was found affecting the insight of patients regarding their diseases. T1DM patients constituted 3.63% of the participants while T2DM (T2DM) constituted 96.37%, similar to the original study's population.²¹

Conclusion

DDS17-Turkish scale was valid and reliable, and had satisfying fit-index parameters. It could be implemented to Turkish DM patients. Further analyses with other instruments measuring anxiety and depression must be done for supporting this scale.

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