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Виправлення статті «Дослідження валідності й надійності шкали фатальних наслідків у хворих на цукровий діабет 2-го типу в Туреччині».
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Через ненавмисну помилку авторів редакція не отримала остаточний варіант рукопису. Зокрема, виправлення стосуються інтерпретації результатів дослідження.

Автори вибачаються перед усіма зацікавленими сторонами. Остаточна версія статті наведена нижче.

Corrigendum to "Validity and reliability study of Diabetes Fatalism Scale in Turkish patients with type 2 diabetes". International Journal of Endocrinology (Ukraine). 2022. 18(3). 139-144. https://doi.org/10.22141/2224-0721.18.3.2022.1160.

Due to an unintentional error of the authors, the editorial office did not receive the final version of the manuscript. In particular, the corrections concern the interpretation of the study results.

The authors would like to apologize to all concerned. The corrected version of the article appears in full below.

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Validity and reliability study of Diabetes Fatalism Scale in Turkish patients with type 2 diabetes

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Abstract. ***Background.*** *Turkey is one of the countries with the highest prevalence of diabetes in Europe, with about one in every seven adults diagnosed with diabetes mellitus. By 2035, Turkey will have the highest number of people with type 2 diabetes in Europe, at almost 12 million. Mortality rates have increased with the increasing prevalence of type 2 diabetes, especially in the younger population, such that half of the deaths come from those under sixty. The beliefs and mental state of patients with chronic illnesses like diabetes can affect disease outcomes and the patients' self-management. Self-care and diabetes medications are important components in improving the disease outcome, though many studies have shown that these activities can be negatively related to fatalism about the disease state. The aim of this study was to investigate the reliability and validity of the Turkish version of the Diabetes Fatalism Scale (DFS), which was developed by Dr. Leonard Egede.* ***Materials and methods.*** *This was a methodological study. The scales were administered to a total of 139 patients with type 2 diabetes. The content and construct validity of the scale were assessed. The construct validity was evaluated using confirmatory factor analysis, and the reliability was assessed in terms of internal consistency.* ***Results.*** *In terms of the population tested, 54.7 % of the participants were men, 73.4 % were married, 54 % had one additional disease other than diabetes, 18 % were high school graduates, the mean age was 50.20 ± 16.82 years, the average duration of diabetes was 19.31 ± 14.25 years, and mean glycated hemoglobin level was 7.06 ± 0.65 %. It was found that the Kaiser-Meyer-Olkin (KMO) measure of sampling-size adequacy was 0.770, indicating an adequate size, and the chi-square value was 1078.402. When the fifth item was excluded from the study and the analysis was repeated, the KMO coefficient was 0.802 and the chi-square value was 1020.244, p = 0.000. The Cronbach's alpha value reached 0.806, indicating a good internal consistency. The Cronbach's alpha values of the other subscales also seemed to be at a very good level.* ***Conclusions.*** *Our study showed that the DFS is a valid and reliable scale for the Turkish society. DFS-T is a suitable scale for health professionals to use to assess diabetes fatalism in adults with diabetes in Turkey.*

Keywords: *type 2 diabetes; fatalism; nursing; reliability; validity*

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Introduction

Type 2 diabetes mellitus (DM) is a global chronic disease that has been increasing in prevalence every decade, with 1 in 7 adults living with DM and 3 of 4 cases are from low or middle class countries [1]. Turkey is one of the counties with the highest prevalence in Europe, with about one in every seven adults diagnosed with DM. By 2035, Turkey will have the highest number of people with type 2 DM in Europe, at almost 12 million [2].

Mortality rates have increased with the increasing prevalence of type 2 DM, especially in the younger population, such that half of the deaths come from those under sixty [2]. The beliefs and mental state of patients with chronic illnesses like DM can affect disease outcomes and the patients' self-management [3]. Self-care and diabetes medications are important components in improving the disease outcome [4], though many studies have shown that these activities can be negatively related to fatalism about the disease state [5].

Fatalism can lead to a decrease in healthy behaviors that are known to improve diabetes-related outcomes, like eating healthy foods, exercising, and not smoking [6, 7]. Fatalism is the belief that the person has no means of control over their own symptoms, and they become totally dependent on a higher power, mainly God [8]. Fatalism may be a shared construct across cultures and religions [9]. However, there is little attention given to how a person with a chronic illness, in general, and diabetes, specifically, responds to fatalism and its subsequent implications on disease self-management. Patients endorsing fatalistic views about the disease believe that it is something coming from God and that they do not have power and control over it [9, 10].

This belief affects the ability of diabetes patients to cope with their disease and adopt self-care practices, but the absolute effects on the self-management of diabetes are unclear [10, 11]. Diabetes fatalism is characterized by hopelessness, perceptions of despair, and powerlessness [12]. Many studies about diabetes fatalism found that diabetes fatalism is related to poor health outcomes, poor glycemic control, and lower quality of life [12–14]. Fatalism is associated with individuals' coping response and spiritual beliefs and also type 2 DM experience [13]. Previous studies findings show that type 2 DM fatalism is also related to poor self-care and glycemic control [13, 14]. It reflects patients opinions whether and to what extent they can control the outcomes of their behaviors [14, 15]. DM fatalism has been studied in ethnic groups such as African-Americans [12, 13], South Asians in UK [16], Latinos/Hispanic [3] and Iranians [17] and increased fatalistic beliefs and practices negatively impacted diabetes self-care and glycemic control.

According to the findings of an international comparative field study carried out recently, unlike people from Canada, US and Norway, half of the people participating in the study in Turkey acknowledged that "they have very little to change the course of their own life" [18]. There are fatalism scales developed in the international literature in many different fields [19]. It is observed that the studies on fatalism in Turkey were mostly carried out in the field of religion [20].

The fatalism studies in Turkey are quite limited although it is a Muslim country with a strong belief in destiny. Studies that determine the fatalism status of health-related patients will shed light on this area. Because fatalism is effective in many areas from health to social life in Muslim countries. L.E. Egede and C. Ellis developed the Diabetes Fatalism Scale (DFS) to determine the level of a diabetic patients' fatalism [12]. The DFS scores were significantly associated with quality of life, self-care, healthy lifestyle choices, blood sugar testing, and glycated hemoglobin (HbA1c) levels of DM patients [5, 12]. The purpose of this study was to validate the Turkish version of DFS.

Materials and methods

Sample

This methodological-type research study consisted of 139 type 2 diabetes patients in Turkey. The patients were chosen randomly and were selected in accordance with the following criteria: aged older than 18 years; have had a DM diagnosis for at least one year; were not pregnant; were fully oriented and conscious; diabetic patients who did not have problems with vision, hearing, or using their hands; and who could read, write, speak, and understand Turkish. The face-to-face interview method was used for collecting data by researchers and it lasted 20 minutes The study has three steps:

1) the adaptation to Turkish language;
2) testing the content validity;
3) performing psychometric analyses.

Linguistic Validity and Assessment of the Data

In step one, the original scale was translated from English to Turkish by individuals who speak both languages well. First it was translated from Turkish to English then the scale in Turkish was back-translated into English. Second, items in original original scale were compared with items in back-translated scale. After examining the compatibility between the original English scale and the translated one, the Turkish scale was finalized.

Content Validity

In step two, to test content validity, the Turkish scale was sent to an expert panel (including an endocrinologist, two diabetes nurses, one psychiatrist, three nurses in academic institutions) who have worked on type 2 DM. This expert panel evaluated the items of the scale in terms of distinctiveness, understandability and appropriateness for the purpose. Davis technique was used to test content validity based on the views of experts [12]. In step three, the Turkish scale was piloted on 10 patients with type 2 DM who met study criteria to obtain initial assessment of the Turkish scale and all items in Turkish scale was understood by patients.

Measurement Instruments

Two forms were used to collect the data, one was sociodemographic form that consist of questions such as gender, age, educational level and DM duration. And other was the scale DFS to measure the level of diabetes fatalism of patients with type 2 DM. DFS has 12 items that are scored on 6-point Likert ranging from 1 = strongly disagree to 6 = strongly agree and three sub-scales that are "perceived self-efficacy (powerlessness)", "religious and spiritual coping (hopelessness)" and "emotional distress (despair)". Higher scale total scores represent more fatalistic attitudes

Table 1. Sociodemographic characteristics of the participants

Characteristics		n	%
Gender	Female	63	45.3
	Male	76	54.7
	Total	139	100.0
Marital status	Married	102	73.4
	Single	37	26.6
Presence of other diseases	Yes	75	54.0
	No	64	46.0
Education status	None	31	22.3
	Elementary	36	25.9
	Middle School	30	21.6
	High School	25	18.0
	University	17	12.2
	Total	139	100.0
	Min–Max	**Mean ± SD**	
HbA1c, %	6.00–9.20	7.06 ± 0.65	
Age, years	18.00–91.00	50.20 ± 16.82	
Duration of diabetes, years	1.00–52.00	19.31 ± 14.25	

of patients with type 2 DM towards diabetes. The original DFS has a good internal consistency (Cronbach's alpha = 0.804) [12].

Data Analysis

Descriptive statistics, exploratory factor analysis (EFA), confirmatory factor analysis (CFA), the multiple fit indexes of chi-square goodness, goodness of fit index (GFI), the adjusted goodness of fit index (AGFI), the comparative fit index (CFI), the standardized root mean square residuals (SRMR), and the root mean square error of approximation (RMSEA) were used to evaluate the psychometrics of the scale. Data analysis was performed using SPSS 24.0 and AMOS software packages.

Ethical Consideration

Permission was obtained via e-mail from Dr. Leonard Egede, who developed the scale and the copyright owner to adapt the Diabetes Fatalism Scale to Turkish. The purpose of the study was explained to patients with type 2 DM who volunteered to participate in the study and met the study criteria and gave signed written consent.

Results

In this study, 54.7 % of the patients were men, 73.4 % were married, 54 % had another disease, 18 % were graduated from high school, the average age of patients was 50.20 ± 16.82 years, the average duration of DM was 19.31 ± 14.25 years, and the mean HbA1c was 7.06 ± 0.65 % (Table 1).

Exploratory Factor Analysis

The Kaiser-Meyer-Olkin (KMO) coefficient and Bartlett's test were measured to determine whether the data set was fit for factor analysis. It was found that the KMO measure of sampling adequacy value was 0.770, and the chi-square value was 1078.402. Since the KMO coefficient was higher than 0.6 and the Bartlett's test of significance level was lower than 0.05 ($p < 0.05$), the data set was found to be fit for factor analysis. According to the total explained variance table, it can be said that the 12 items were weighted into groups of four factors because the number of components is four. The first of these four factors alone accounted for 40.6 % of the total variance, the second factor accounted for 17.7 %, the third accounted for 12.4 %, and the fourth accounted for only 8.9 %. These four factors together made up 79.6 % of the total variance. The rotated factor matrix that examined how the items were weighed in each factor showed that it was necessary to exclude the fifth item from the scale because it alone constituted the fourth factor (Fig. 1).

When the fifth item was excluded from the study and the analysis was repeated, the KMO coefficient became 0.802 and the chi-square value became 1020.244, with $p = 0.000$. In the new total explained variance table lacking the fifth item, 11 items were weighed into groups of three factors. The first of these four factors alone accounted for 43.4 % of the total variance, the second accounted for 19.3 %, and the third accounted for 13.6 %. These three factors toge-

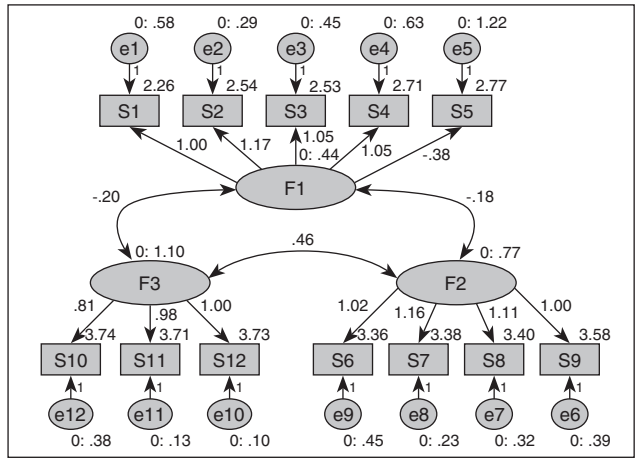

Figure 1. Structural equation model with standardized path coefficients of Diabetes Fatalism Scale dimensions

ther accounted for 76.2 % of the total variance. In the rotated component matrix given below, items 6, 7, 8, and 9 are weighted in the first factor, items 10, 11, and 12 are in the second factor, and items 1, 2, 3, and 4 are weighted in the third factor (Table 2 and Table 3).

To test the construct validity of the factors extracted using confirmatory factor analysis. CFA using AMOS v22 software was undertaken using maximum likelihood estimation. In the confirmatory factor analysis multiple criteria including goodness of fit index (GFI), adjusted goodness of fit (AGFI), root mean squared error of approximation (RMSA), Comparative Fit Index (CFI) were used to assess the fit of model to the model to data. Guidelines for testing model fit followed guidance, the goodness of fit index (GFI) ≥ 0.90, CFI ≥ 0.90, SRMR < 0.05 and the root mean square error of approximation (RMSEA) < 0.05 [14].

The results evidenced adequate model fit: χ^2/SD = 3.12, GFI = 0.92, AGFI = 091, CFI = 0.90, RMSEA = 0.11 and SRMR = 0.080. When the inner consistency coefficients of the scale were examined for the emotional distress, which corresponded to the first subscale before the exclusion of the fifth item from original scale, the Cronbach's alpha value

Table 2. The factor loading of the DFS-T subscales

Items	Factor			
	1	2	3	4
7 "I believe God does not give me more than I can bear"	0.913			
8 "I believe God can completely cure my diabetes"	0.887			
9 "I have prayed about my diabetes so I am not going to worry about it anymore"	0.805			
6 "Trusting in God has helped me better deal with my diabetes"	0.786			
12 "I believe that diabetes is controllable"		0.917		
11 "If I do everything my doctor tells me, I can prevent the complications of diabetes, like blindness, amputations, kidney failure, impotence, etc."		0.916		
10 "I believe I am able to control my diabetes the way my doctor expects"		0.855		
3 "I get frustrated with having to live with diabetes"			0.853	
4 "Diabetes is a disease that makes life more difficult"			0.807	
2 "I feel down when I think about my diabetes"			0.772	
1 "I get upset when I think about my diabetes"			0.694	
5 "Diabetes causes a lot of suffering for me"				0.938

Table 3. The factor loading of the DFS-T subscale after the removal of item 5

Items	Factors		
	1. Religious and spirituality coping	2. Perceived self-efficacy	3. Emotional distress
7 "I believe God does not give me more than I can bear"	0.922		
8 "I believe God can completely cure my diabetes"	0.870		
9 "I have prayed about my diabetes so I am not going to worry about it anymore"	0.819		
6 "Trusting in God has helped me better deal with my diabetes"	0.791		
12 "I believe that diabetes is controllable"		0.918	
11 "If I do everything my doctor tells me, I can prevent the complications of diabetes, like blindness, amputations, kidney failure, impotence, etc."		0.916	
10 "I believe I am able to control my diabetes the way my doctor expects"		0.857	
3 "I get frustrated with having to live with diabetes"			0.844
4 "Diabetes is a disease that makes life more difficult"			0.797
2 "I feel down when I think about my diabetes"			0.791
1 "I get upset when I think about my diabetes"			0.705

Table 4. Cronbach's alpha values for the Turkish version of the DFS (DFS-T) and its subscales

Subscale	Number of items	Cronbach's α	Number of items	Cronbach's α without item 5
Factor 1	5	0.613	4	0.806
Factor 2	4	0.908	4	0.908
Factor 3	3	0.926	3	0.926
DFS-T	12	0.708	11	0.709

was 0.613. Because the acceptable consistency index was lower than 0.70, the fifth item was excluded from the scale. After excluding the fifth item, the Cronbach's alpha value reached 0.806. The Cronbach's alpha values of the other subscales seem to be at a very good level (Table 4). However, because CFA showed appropriate fit for the 12-item scale, the 11-item version was not supported by the data. Also, given that the Cronbach's alpha for the 12-item version was not different from the 11-item scale (0.708 vs. 0.709), the 12-item scale was used as the final version of the DFS-Turkish.

Discussion

The validity and reliability of a tool used for measuring the fatalism of diabetic patients was tested in this study. The KMO value was determined through exploratory factor analysis according to the literature [15]. The DFS scale has previously been validated and tested in different populations including African American population and general population of the United States of America, British and British South Asians populations, and Lubnan population. Turkey is geographically diverse as Africa and the Middle East is in contact with Europe. In this study, which has a Muslim population we have demonstrated validity of the DFS in a Turkish population, which adds data on the validity and reliability of the DFS in diverse populations.

A KMO value of less than 0.50 indicates that the sample size is not sufficient. The KMO value in our study was 0.770, and this conclusion suggests that the sample size was large enough for the study. For the emotional distress subscale, there may be benefit in removing item 5 since removal of that item increased the subscale alpha to 0.806. However, when using the full scale, the 12 items are recommended since model fit was good including ratio of the chi-square statistics obtained from the confirmatory factor analysis to the degree of freedom (χ^2/df) was 3.12; the RMSEA was 0.119; the GFI value was 0.925; and the CFI value was 0.905. In particular, CFI and GFI values of a model that are 0.90 or higher mean that the model is well adapted [16, 17]. If the RMSEA value is less than or equal to 0.08, it means that the fit is good.

Cronbach's alpha indicates the internal consistency of the scale. The Cronbach's alpha value of the emotional distress subscale, which corresponds to the first subscale, was low without removing the fifth item from the scale. After this fifth item was excluded, the value reached 0.806. The expression corresponding to item 5 of "diabetes causes a lot of suffering for me" showed that the Turkish society may not perceive diabetes as causing emotional distress. This may suggest that the effects of the religious beliefs of the community that we are studying on emotional distress were different from the original audience of this questionnaire. However, a similar study in Arab population in Lebanon with high Muslim population did not show similar findings [19]. Therefore, this may be due to the specific group studied and a larger sample may be needed to determine whether these assumptions are true for the larger Turkish population with diabetes. Dr. Egede and colleague concludes that fatalism is multidimensional and influences people's religious beliefs, values and spirituality as well as their experience of illness, their sense of diabetes, and their personal coping responses. These results may have been obtained as a feature of the language because we have measured the reliability and validity in a society that has different values than the values of the society where the scale was developed. When resignation is regarded as a religion doctrine and is used as a coping mechanism, it may be easier to accept the disease. Dr. Egede indicated in his studies that distress levels increased with the severity of the illness and with the burnout caused by self-care [20]. Religion and spirituality played an important role in coping with illness, and in African societies, illness comes from God. This finding showed a similarity between Asian society and African society. These findings further support the validity of the DFS-T. Some Muslims believe in destiny and predetermined life events that occur beyond a person's control [20]. They believe that their disease comes from God, and they are patient about their illnesses, meaning that they do not consider that their disease causes a lot of suffering for them. The "religious and spirituality coping" and "perceived self-efficacy" subscales of the Turkish version are the same as the original scale. This shows a similarity between Asian society and Western society.

Conclusions

As a result of the this study, DFS is a valid and reliable scale to assess diabetes fatalism for Turkish adults with type 2 diabetes mellitus.

Acknowledgment: Dr. Egede is the copyright holder for the Diabetes Fatalism Scale, including the Diabetes Fatalism Scale-Turkish Version. Request for permission to use any version of the scale should be directed to him at legede@mcw.edu.

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Conflicts of interests. Authors declare the absence of any conflicts of interests and own financial interest that might be construed to influence the results or interpretation of the manuscript.

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Дослідження валідності й надійності шкали фатальних наслідків у хворих на цукровий діабет 2-го типу в Туреччині

Резюме. ***Актуальність.*** Туреччина є однією з країн з найвищою поширеністю цукрового діабету (ЦД) у Європі, адже приблизно в кожного сьомого дорослого діагностований ЦД. До 2035 року в Туреччині прогнозується найбільша кількість людей із ЦД 2-го типу в Європі — майже 12 млн. Рівень смертності зростає зі збільшенням поширеності ЦД 2-го типу, особливо серед населення молодших вікових груп. При цьому половина випадків смерті припадає на осіб віком до 60 років. Психічний стан пацієнтів із хронічними захворюваннями, такими як ЦД, може впливати на перебіг хвороби й здійснення самоконтролю. Належне лікування ЦД сприяє досягненню компенсації хвороби, але при цьому також слід брати до уваги можливість фатальних наслідків на тлі ЦД. ***Мета:*** дослідити надійність і валідність турецької версії шкали фатальних наслідків у хворих на цукровий діабет (DFS), розробленої Dr. Leonard Egede. ***Матеріали та методи.*** Проведено методологічне дослідження. Опитування за допомогою шкали проведено загалом у 139 пацієнтів із ЦД 2-го типу. Оцінено зміст і конструктивну валідність шкали. Валідність шкали оцінювалася за допомогою підтверджувального факторного аналізу, а надійність — з точки зору внутрішньої узгодженості. ***Результати.*** 54,7 % учасників тестування становили чоловіки, 73,4 % — одружені, 54 % мали інше захворювання, 18 % були випускниками середньої школи, середній вік — 50,20 ± 16,82 року, середня тривалість ЦД становила 19,31 ± 14,25 року, а середній рівень глікованого гемоглобіну (HbA1c) — 7,06 ± 0,65 %. Установлено, що показник Kaiser-Meyer-Olkin (KMO) адекватності розміру вибірки дорівнював 0,770, що вказує на відповідний розмір, а значення хі-квадрат становило 1078,402. При виключенні п'ятого пункту з дослідження й повторному аналізі коефіцієнт KMO становив 0,802, а значення хі-квадрат — 1020,244; p = 0,000. Значення Cronbach's alpha досягло 0,806, що вказує на добру внутрішню узгодженість. Значення Cronbach's alpha інших підшкал також були на дуже доброму рівні. ***Висновки.*** Проведене дослідження показало, що DFS є валідною і надійною шкалою для турецької популяції. Шкала DFS-T цілком придатна для оцінки фатальних наслідків серед хворих на цукровий діабет у Туреччині.

Ключові слова: цукровий діабет 2-го типу; фатальні випадки; догляд; надійність; валідність