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Research Article

Psychometric Evaluation of a Turkish Version of the Diabetes Fear of Self-injecting and Self-testing Questionnaire (D-FISQ)

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SUMMARY

Purpose: To examine the psychometric properties of a Turkish version of the Diabetes Fear of Injecting and Self-testing Questionnaire (D-FISQ).
Methods: Forward-backward translation of the D-FISQ from English into Turkish was conducted. Original English and translated forms were examined by a panel group. Validity was investigated using content, confirmatory factor analysis, and divergent validity. Reliability was assessed using Cronbach α values, item-total correlations, and intraclass correlations. The sample comprised 350 patients with diabetes. Data were analyzed using SPSS 15.0 for Windows and LISREL 8.
Results: The content validity index for the panel members was .90, which indicated perfect content validity; items in D-FISQ were clear, concise, readable, and distinct. Confirmatory factor analysis confirmed the original construct of the D-FISQ. All items had factor loadings higher than the recommended level of .40. The D-FISQ scores were discriminated by the level of anxiety. Reliability results were also satisfactory. Cronbach α values were within ideal limits. Item-total correlation coefficient ranged from .72 to .86. In terms of test-retest reliability, intraclass correlation coefficient was found to be over .90.
Conclusions: D-FISQ is a valid and reliable questionnaire in assessing needle-prick fear among Turkish patients with diabetes. We recommend performing the Turkish D-FISQ in determining and screening patients with diabetes who have fear related to self-insulin injection and finger-prick test. Thus, health care professionals should be aware of the potential consequences of injection fear such as insulin misuse and poor self-monitoring of blood glucose, which may have unfavorable effects on optimal diabetes management.

Introduction

Patients with type 1 diabetes require lifelong insulin therapy, starting from the time of diagnosis. A partial insulin reservoir is maintained in patients with type 2 diabetes, which enables these patients to be well controlled only with oral antidiabetic drugs without requiring insulin for a while. However, studies indicate that patients with type 2 diabetes often become insulin-dependent within 10 years of diagnosis [1]. For that reason, early and appropriate initiation of insulin therapy for patients with type 2 diabetes is now clearly supported by American and European guidelines [2].

It is known that insulin is the most effective agent for lowering glucose and achieving metabolic control. Studies have shown the efficacy of insulin therapy in preventing complications of chronic diabetes including retinopathy, nephropathy, neuropathy, and macrovascular diseases, as well as in decelerating these health problems in patients with both type 1 [3] and type 2 diabetes [4].

It is very important for patients who require insulin therapy to understand the balance between medical nutrition therapy, exercise, and insulin therapy, and to take appropriate measures to maintain this balance. In this context, patients are expected to self-monitor blood glucose and make appropriate adjustments to diet, exercise program, and insulin doses, according to their blood glucose results. Unfortunately, many patients do not achieve satisfactory adherence to recommendations regarding their insulin treatment. One reason for this is injection phobia [5].

However, relatively few studies have examined the prevalence and effects of injection and self-testing phobia. The estimated prevalence of injection phobia in pregnant women with diabetes

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was 43.1% [6]. Fear of needles in children with diabetes also seems to be common. One study [7] found that 27.0% of children with diabetes aged between 2 years and 21 years were affected by needle phobia. Similarly, the prevalence of fear of self-testing and fear of self-injection in adolescents with diabetes was 12.0% and 22.0%, respectively [8]. In the adult population [9], the prevalence was reported at 0.2%–1.3% for injection fear and 0.6%–0.8% for fear of self-testing, which were considerably lower than data from patients with gestational diabetes and childhood diabetes. As far as we know, no studies have been performed on Turkish patients with diabetes on this subject.

The fear of self insulin injection and finger-prick testing plays an important negative role in patient adherence. A systematic review that included 17 studies [5] confirmed fear of these procedures as reasons for nonadherence. Evidence also suggests that fear of self insulin injection and finger-prick testing can lead to inaccuracy of insulin doses, failure in self-monitoring blood glucose, and even recording false blood glucose values without actually testing. As a result, lack of adherence to diabetes management can cause deteriorations in metabolic control [8,10,11]. Furthermore, women with injection phobia presented increased risk for adverse obstetric outcomes, premature delivery, and higher neonatal morbidity [12].

Diabetes is a major public health issue in Turkey. Two cross-sectional surveys that comprised nationally representative samples of more than 20,000 individuals showed that the prevalence of diabetes was 7.2% and 16.5%, respectively [13,14]. There is no doubt that the prevalence of diabetes has now reached epidemic proportions, rising by 90.0% between 1998 and 2010. This means that increasingly more patients need insulin and probably experience fear of injection and finger prick.

For all the above reasons, it is essential that steps are taken to decrease and manage patients' insulin injection fear and finger-prick fear. Nurses are key professionals in determining patients' insulin injection fear and finger-prick fear, and exploring the underlying reasons. Then, they can employ appropriate interventions including education and support to overcome these problems because adherence to insulin treatment is the most effective tool in achieving satisfactory metabolic control [15].

As far as we know, there are no studies in Turkish patients with diabetes on injection and self-testing fear. Fear of self-injecting and self-testing can be measured using the Diabetes Fear of Injecting and Self-testing Questionnaire (D-FISQ), which is a reliable and validated tool among patients with diabetes who need insulin [7,10,16]. The advantage of using a standardized instrument such as D-FISQ, is the ability to obtain comparative data of different populations from international trials even though cultural adaptation is needed. Therefore, we aimed to adapt the D-FISQ for the Turkish population and investigate its psychometric properties.

Methods

Setting and samples

This survey study was conducted at the diabetes outpatient clinic of a university hospital between July 2008 and January 2009. The proposed study sample consisted of all patients with diabetes who met the eligibility criteria. Patients were eligible to participate if they (a) were aged 18 years or more and literate, (b) had been diagnosed as having diabetes for at least 1 year, (c) had been receiving insulin therapy for at least 6 months, and (d) had intact functions of hearing, speaking, and cognition. In total, 357 patients met the eligibility criteria. However, seven patients refused to participate in the study. Thus, 350 patients completed the study, yielding a response rate of 98.0%.

Although there is no concensus on absolute sample size for validity studies, the number of subjects ranges from at least 5 individuals [17] to 20 individuals [18] for each item in the instrument being used to perform the factor analysis. In this study, the instrument tested for psychometric properties contained two factors with 15 items and the minimum number of participants required was estimated to be 60. Accordingly, we included 350 patients in the study, which was roughly equal to 23 subjects per item.

Instruments

Three intruments including the Basic Information Form, D-FISQ, and the State Anxiety Inventory were used.

Basic Information Form

The Basic Information Form, which was developed by the authors, consisted of two sections. The first section contained questions on sociodemographic data including sex, age, and educational status. In the second part, there were five questions on type of diabetes, duration of diabetes, mean duration of insulin therapy, daily number of insulin injections, and level of HbA1C.

D-FISQ

The D-FISQ was developed to determine fear regarding self-injecting and self-testing among patients with diabetes who required insulin therapy. The D-FISQ consists of a total of 15 items in two dimensions on fear of self-injecting (FSI, 6 items), and fear of self-testing (FST, 9 items). Each item is scored on a 4-point Likert scale ranging from 0 to 3 (0 = *almost never*, 1 = *sometimes*, 2 = *often*, 3 = *almost always*). Assessment of the questionnaire can be performed by calculating the mean raw score for each subdimension and the overall questionnaire. It is recommended to calculate the mean value when there are several replies of zero in the questionnaire. When raw scores are assessed, the FSI score ranges from 0 to 18, the FST score from 0 to 27, and the D-FISQ total score ranges from 0 to 45 with higher scores indicating increased fear [16]. In the present study, calculations for subdimensions and the overall questionnaire were initially performed with mean values because there was a high number of zero replies. However, because standard deviations were too high in this calculation, the mean values of the replies were reassessed after recoding as "1 = *almost never*, 2 = *sometimes*, 3 = *often*, 4 = *almost always*" upon consulting a statistician. Thus, the FSI score ranged from 6 to 24, the FST score from 9 to 36, and the D-FISQ-total score ranged from 15 to 60.

State Anxiety Inventory

The Turkish version of the State Anxiety Inventory was used to evaluate state anxiety level. The lowest score that can be obtained with this inventory is 20, and the highest score is 80. A total score of 20–39 indicates mild anxiety, 40–59 indicates moderate anxiety, 60–79 indicates severe anxiety, and 80 and over indicates panic or crisis [19].

Procedures and data collection

The study consisted of three stages including translation, validation, and reliability testing of the D-FISQ.

Translation included a four stage process: (a) forward translation from English into Turkish; (b) backward translation from Turkish into English; (c) examination of the original English, Turkish, and backward translated English forms for discrepancies,

meaning errors and resolution of all differences in the forms; and (d) producing the final D-FISQ Turkish version.

Validity of D-FISQ was assessed for content, construct, and divergent validity. An expert panel including 12 diabetes nurses, family physicians, diabetes specialists, dieticians, and a psychologist who was experienced in working with patients with diabetes examined the content validity. All panel members scored items for relevancy, simplicity, and clarity on a 4-ordinal-point scoring system where 1 indicated *not acceptable*, 2 indicated *somewhat acceptable*, 3 indicated *acceptable*, and 4 indicated *highly acceptable*. The content validity index (CVI) for each item (I-CVI) and for the total D-FISQ was then calculated. The I-CVI was evaluated with an agreement degree among the panel experts on each item that achieved a rating of 3 or 4. For example, if item 1 achieved a rating of 3 or 4 by 10 of the 12 panel experts, I-CVI would be 83.3. Following computing I-CVI for each item on the scale, we then calculated the average I-CVI across items to get the CVI value for the total D-FISQ. A value equal to or greater than .80 for both I-CVI and CVI for the total D-FISQ was considered acceptable, and a value equal to or greater than .90 for both dimensions was considered perfect [20]. In our study, the CVI value of each item and for the total D-FISQ exceed .90, which indicated perfect content validity by means of items in D-FISQ, which are clear, concise, readable and distinct.

Construct validity was evaluated to prove two-factor structure of the D-FISQ. Divergent validity was tested to evaluate discriminative power of D-FISQ. Reliability was assessed to test internal consistency and test-retest stability of the D-FISQ. Construct and divergent validity and internal consistency was tested in the total sample.

Instruments were administered in the hospital education room located in the diabetes outpatient clinic, a quiet, well-lit room providing an atmosphere in which patients could concentrate on completing the questionnaires without being disturbed. The Basic Information Form was used to collect information on sociodemographic and diabetes- related variables. Afterwards, patients were asked to self-administer the D-FISQ and State Anxiety Inventory.

For test-retest stability, we invited subjects who were able to visit the clinic within 2 weeks of the first evaluation. In total, 63 patients agreed to make a second visit to clinic. Two days before the scheduled date, a researcher phoned the patients to remind them of their appointment. Of the 63 patients who agreed, 52 patients made the second visit to the clinic and completed the D-FISQ.

The patients completed the D-FISQ in 4–12 minutes, with 95.0% completing the questionaire in 6 minutes or less. The average time required to complete the questionnaire was 5.5 minutes.

Data analysis

Descriptive statistics including means, ranges, standard deviations for continuous variables, and percentages for categorical variables were used to summarize the participants' demographics and disease-related characteristics.

Construct validity was evaluated by confirmatory factor analysis (CFA). In the CFA, Chi-square test (χ^2), goodness of fit index (GFI), adjusted goodness of fit index (AGFI), comparative fit index (CFI), and root mean square error of approximation (RMSEA) were examined as goodness of fit indices. We assumed that $\chi^2 < 2.0$ [21], GFI > .95, AGFI > .90, CFI > .97, and RMSEA < .05 indicated perfect fit, whereas χ^2 < 3.0, GFI > .90, AGFI > .85, CFI > .95, and RMSEA < .08 indicated acceptable fit [22]. We expected that the FSI and FST subscales would emerge from CFA as defined in the original study [16] and items related with FSI and FST would be grouped together within a single factor. Factor loading for each item was predicted to be > .40 [23].

To examine divergent validity, we investigated whether mean scores for the subdomains in D-FISQ and mean scores for the overall questionnaire varied by anxiety level. One-way analysis of variance (ANOVA) test was used to test divergent validity. A Bonferroni test was applied after the ANOVA test to determine the meaningful distinction. We hypothesized that individuals who had moderate or severe anxiety would have higher fear scores as indicated in the literature [10].

By means of reliability, internal consistency was assessed using Cronbach α and item-total correlation. We accepted that a minimum Cronbach α of .90 was ideal, Cronbach α > .80 was very acceptable, and > .70 was acceptable as recommended in the literature [23]. The correlation between each item and total was analyzed with Pearson's correlation coefficients. The threshold was specified as > .40 for the item-total correlation coefficient [23].

In terms of stability, test-retest correlation was assessed by intraclass correlation coefficient (ICC) in a sample of 52 patients. The retest procedure was conducted 2 weeks after the first evaluation of the D-FISQ. Two weeks was judged to be the optimum retest interval: this would be sufficiently long for patients to forget their initial responses to the 15 items in D-FISQ, but not so long that most fear factors of self-injecting and self-testing would change substantially. Acceptable ICC was determined as .75 [24].

SPSS 15.0 for Windows [25] was used for all analyses including descriptive statistics, CVI, Cronbach α coefficient and Pearson's correlation coefficient analysis, One-way ANOVA, and Bonferroni test. LISREL 8.0 [26] was used for CFA. Statistical significance for all analysis was taken at the 5% level.

Ethical considerations

We conducted the study in accordance with the Helsinki Declaration and obtained approval from the local ethics committee (20071473). All participants were informed about the purpose of the study and were assured of confidentiality. Informed written consent was obtained from each patient before participation in the study. We also obtained permission from Frank Snoek to adapt the D-FISQ into Turkish and to study its psychometric properties.

Results

General characteristics of participants

The general characteristics of the participants are shown in Table 1. The mean age of the participants was 47.3 years, the majority of them were women, married, and had education at primary school level. More than half of the participants (61.4%) had type 2 diabetes with a mean diabetes duration of 13 years. In all, 36.3% of the participants had been under insulin treatment since diagnosis, and 64.6% were injecting insulin three times or more a day. The mean duration of insulin therapy was 8 years and the mean HbA1c value was 8.1%.

Construct and divergent validity of D-FISQ

The CFA showed that the two-dimension model demonstrated a better fit-index compared with the single-dimension model (Table 2). Factor loadings of each item, error ratios, and correlation coefficient between FSI and FST are presented in Table 3. Factor loading for items in FSI ranged from .78 to .86, and factor loading for items in FST ranged from .72 to .90. All items in FSI grouped under the first factor and all items in FST grouped under the second factor. All observed variables were significantly related to the latent variables, and the correlation coefficient between the two subdimensions was .76.

Table 1 *General Characteristics of Sample (N = 350).*

Variables	n	%
Gender		
Women	190	54.3
Men	160	45.7
Marital status		
Married	246	70.3
Unmarried	104	29.7
Educational status		
Primary school graduates (5 yr education)	156	44.6
Secondary high school graduates (8–12 yr education)	90	25.7
University graduated (≥ 14 yr education)	104	29.7
Type of diabetes		
Type 1	135	38.6
Type 2	215	61.4
Diabetes regimen modality		
Insulin since baseline	127	36.3
Oral hypoglycemic agents plus insulin	119	34.0
Initially oral hypoglycemic agents, currently insulin	104	29.7
Frequency of insulin injections		
Once a day	25	7.1
Twice a day	99	28.3
Three times or more a day	226	64.6
Age (Mean ± *SD*, yr)	47.31 ± 15.06	
Duration of diabetes (Mean ± *SD*, yr)	12.94 ± 7.14	
Duration of insulin therapy (Mean ± *SD*, yr)	8.30 ± 6.75	
HbA1c value (Mean ± *SD*, %)	8.10 ± 1.48	

Table 2 *Model Tests and Comparisons (N = 350).*

Tested models	χ^2/df	GFI	AGFI	CFI	RMSEA	$\Delta\chi^2$
Independent model	13.66	–	–	–	–	
Model 1 (Hypothesized model with two factors)	1.00	.70	.59	.93	.018	
Model 2 (Alternative model with one factor)	1.90	.57	.43	.89	.240	96,925

Note. AGFI = adjusted goodness of fit index; CFI = comparative fit index; GFI = goodness of fit index; RMSEA = root mean square error of approximation.

By means of divergent validity, as shown in Table 4, the mean FSI and FST scores and the total score of the D-FISQ were significantly higher among patients with moderate or severe levels of anxiety than patients with mild anxiety.

Table 3 *Results of Confirmatory Factor Analysis of Two-factor Model of D-FISQ (N = 350).*

Variables	Items	Factor loading	Error ratio
FSI	When I have to inject myself		
	FSI1. I become restless	.82	.33
	FSI2. I feel tense	.86	.25
	FSI3. I feel afraid	.78	.38
	FSI4. I worry about it	.85	.27
	FSI5. I feel nervous	.84	.29
	FSI6. I brood about it	.84	.30
FST	When I have to prick my finger		
	FST7. I become restless	.78	.40
	FST8. I try to avoid it	.72	.48
	FST9. I feel tense	.86	.25
	FST10. I feel afraid	.79	.38
	FST11. I worry about it	.83	.31
	FST12. I feel nervous	.90	.19
	FST13. I brood about it	.85	.27
	FST14. I try to postpone it	.78	.38
	FST15. I get angry	.89	.21

Correlation coefficients between FSI and FST = .76.
Note. D-FISQ = Diabetes Fear of Injecting and Self-testing Questionnaire; FSI = fear of self-injecting; FST = fear of self-testing.

Reliability of the D-FISQ

Reliability results are presented in Table 5. Cronbach α was .96 for D-FISQ total, .93 and .95 for the subdimensions of FSI and FST, respectively. The item-total correlation coefficient ranged from .75 to .85 for FSI and from .72 to .86 for FST. In terms of the test-retest stability, ICC was found to be .93, .95, and .96 for FSI, FST, and D-FISQ, respectively.

Discussion

The results of this study confirmed that the Turkish D-FISQ has satisfactory psychometric properties including validity and reliability.

Construct and divergent validity of D-FISQ

This study confirmed the construct and divergent validity of the D-FISQ. To our knowledge, this is the first CFA examination of D-FISQ. Based on the satisfactory factor loadings for each item exceeding .40, as recommended in the literature [23], two factors emerged in CFA, which was similar to the original factor structure of D-FISQ; a high correlation coefficient between the two factors confirmed construct validity for the questionnaire, although GFI and AGFI did not meet the expected criteria.

There are varying suggestions in the literature about the number, type, and cut-off values for GFI. However, the RMSEA is one of the most sensitive and reliable indices among them [27], and regardless of other fit indices, structural equation modeling is acceptable if RMSEA is not larger than .10 [28]. CFI is also one of the most popularly reported fit indices because it is one of the measures least affected by sample size [29].

In CFA, we found that a hypothesis model with two factors provided a better explanation of changes (variance-covariance) observed in the data set. An RMSEA of about .018 was considered evidence of perfect fit [22,28]. In addition, a value of χ^2 less than 1.0 indicated perfect fit [21], CFI of about .93 indicated acceptable fit [22] of the two-factor model. GFI and AGFI did not meet the expected criteria. This result might be related to our large sample size. It is recommended not to use these measures as standard fit indices because they tend to be lower when the sample size is over 200 [29].

In our study, the adequacy of the two-factor model must also be considered in terms of the parameter estimates: first, all factor loadings were high and positive, which indicated that all items were strongly related with their factors; second, correlation between FSI and FST was very strong, thereby suggesting that the nucleus of both scales was similar, although particular discrepancies did exist. Third, three of the GFIs, especially RMSEA of the two-factor model, were more superior than the acceptable limit. Thus, we can say that results of the construct validity of D-FISQ were satisfactory.

Similar to our results, a previous study demonstrated two factors, all items contributed to only one factor with factor loading exceeding .40 [10]. In another study, two factors were also obtained [30]. These results suggest that the underlying components of the Turkish D-FISQ were similar to the original D-FISQ.

The present study also showed that D-FISQ and two of its subdimensions could discriminate patients with mild, moderate, and severe anxiety level, as we expected. Our results correlate well with the a previous study [10]. We can conclude that D-FISQ can discriminate patients with different levels of anxiety.

Table 4 *Findings on Discriminative Validity of D-FISQ (N = 350).*

Variables	Mild anxiety ($n = 256$)	Moderate anxiety ($n = 89$)	Severe anxiety ($n = 5$)	F	p	p[a]		
						Mild anxiety vs. moderate anxiety	Moderate anxiety vs. severe anxiety	Mild anxiety vs. severe anxiety
FSI	7.06 ± 2.72	8.88 ± 3.53	12.20 ± 6.72	17.88	< .001	< .001	.003	< .001
FST	10.75 ± 4.03	12.40 ± 4.50	19.80 ± 4.83	14.77	< .001	< .001	.008	< .001
D-FSIQ total	17.82 ± 6.08	21.29 ± 7.37	32.17 ± 17.13	18.72	< .001	< .001	.007	< .001

Note. D-FISQ = Diabetes Fear of Self-injecting and Self-testing Questionnaire; FSI = fear of self-injecting; FST = fear of self-testing.
[a] Bonferroni test p value.

Table 5 *Results of Internal Consistency and Test-retest Reliability.*

Variables	Items	Item-total correlation	Cronbach α if item is deleted
FSI	When I have to inject myself		
	FSI1. I become restless	.79	.91
	FSI2. I feel tense	.85	.90
	FSI3. I feel afraid	.75	.92
	FSI4. I worry about it	.81	.92
	FSI5. I feel nervous	.80	.92
	FSI6. I brood about it	.80	.92
	Cronbach α = .93 ($N = 350$)	ICC = .93 ($n = 52$)	
FST	When I have to prick my finger		
	FST7. I become restless	.78	.95
	FST8. I try to avoid it	.72	.95
	FST9. I feel tense	.86	.94
	FST10. I feel afraid	.78	.94
	FST11. I worry about it	.80	.94
	FST12. I feel nervous	.85	.94
	FST13. I brood about it	.81	.94
	FST14. I try to postpone it	.78	.94
	FST15. I get angry	.84	.94
	Cronbach α = .95 ($N = 350$)	ICC = .95 ($n = 52$)	
D-FSIQ total	Cronbach α = .96 ($N = 350$)	ICC = .96 ($n = 52$)	

Note. D-FISQ = Diabetes Fear of Self-injecting and Self-testing Questionnaire; FSI = fear of self-injecting; FST = fear of self-testing; ICC = intraclass correlation coefficient.

Reliability of D-FISQ

The reliability findings in our study indicated satisfactory results. First, Cronbach α values were ideal for two subdimensions and the total questionnaire [23]. Second, the item-total correlations for all items in the FSI and FST exceeded the accepted standard [23]. Finally, ICC results based on a 2-week interval supported evidence for the overtime stability of the Turkish D-FISQ.

Our results of Cronbach α were compatible with findings from previous studies in which Cronbach α values were between .87 to .94 for FSI and .90 to .97 for FST [7,10,16].

In this study, item-total correlations, which were over the accepted standard, suggested that the items measured phenomena pertinent to the construct [23]. Our results were also compatible with a study in which item-total correlations ranged from .55 to .72 in FSI and from .48 to .73 in FST, all of which were within accepted standards [10].

To our knowledge, the test-retest stability of the D-FISQ was not assessed in the original study. In the present research, the test-retest approach was favored for the D-FISQ, as it has the advantages of being easy to perform in the study program, being appropriate for a self-report questionnaire. Also, it has recently been presented as having strong internal consistency.

In our study, the 2-week test-retest stability results for FSI and FST were perfect compared with findings reported in a previous study [10] in which the test-retest reliability was reported as .58 for FSI and .50 for FST after 3 months, and .68 for FSI and .50 for FST after a 15-month interval. The authors concluded that a test-retest procedure over a shorter period of time as 1–2 weeks may be useful. In our study, 2 weeks was judged to be the optimum retest interval. A study from Spain replicated our stability results (the test-retest reliability of FSI and FST was .85 and .94, respectively) in their sample after a 2-week interval [30].

Based on the reliability results mentioned above, we conclude that the FSI and FST domain in the D-FISQ was consistent and replicated.

Conclusion

Based on the validity and reliability analyses, it can be concluded that the D-FISQ with two factors is a reliable and valid questionnaire for assessing fear of needle-prick among Turkish patients with diabetes.

Clinical use of the Turkish D-FISQ helps determine and screen patients with diabetes who have fear regarding self-injection of insulin and the finger-prick test. In addition, the findings suggest a need for further research to explore why some patients with diabetes fear self-injection of insulin and finger-prick testing more than other patients do. These evaluations would also facilitate supporting patients in this context. Finally, healthcare professionals should be aware of the potential effects of fear, including delinquencies in insulin injections and poor self-monitoring of blood glucose during diabetes management in people with diabetes who have adjustment problems and poor metabolic control. Patients with diabetes who have fear of self-injection and finger-prick testing should be followed up closely to prevent metabolic deterioration and should also be educated on how they can manage their fear.

Conflicts of Interest

No conflict of interest has been declared by the authors. This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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