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RESEARCH METHODOLOGY PAPER

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Development, reliability, and validity of the Insulin Treatment Self-Management Scale

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Abstract

Aim: The aim of this study was to develop a valid and reliable measuring tool to determine the level of self-management of insulin treatment by individuals with diabetes.

Methods: This was a methodological instrument development study. This study was conducted in a training and research hospital in Istanbul, Turkey, between January and June 2014.The sample of the study included 311 individuals with diabetes. The item pool was formed with 63 items. The content validity was assessed by 14 experts. The draft scale with 58 items was formed with a five-point Likert type scale. The structural validity of the scale was assessed via exploratory factor analysis. In the context of reliability analyses, the item-total score correlation, the split-half method, and the test-retest application were used.

Results: The scale had 32 items and three subscales. The first factor was called "behavioral subdimension," the second as "cognitive subdimension," and the third, "affective subdimension." The total Cronbach alpha value of the scale was 0.91.

Conclusion: Preliminary validity and reliability was demonstrated for a newly developed scale for measuring insulin treatment self-management of adult individuals with diabetes.

KEYWORDS

instrument development, insulin, nursing, reliability, self-management, validity

SUMMARY STATEMENT

What is already known about this topic?

- Personal management of insulin treatment is crucial for the success of diabetes treatment.
- Knowledge, attitudes, and behaviors of individuals with diabetes related to insulin treatment should be improved by self-management training.
- Most scales that measure diabetes self-efficacy and self-management among individuals with diabetes do not include items on insulin management.

What this paper adds?

- Preliminary validity and reliability was demonstrated for the Insulin Treatment Self-Management Scale.
- The effectiveness of insulin treatment self-management can now be measured with a valid and reliable tool to support effective diabetes management.

The implications of this paper:

- The Insulin Treatment Self-Management Scale can help nurses identify the lack of knowledge and skills and negative attitudes about insulin treatment in individuals with diabetes.

- The Insulin Treatment Self-Management Scale can help nurses plan and perform more effective patient education to improve the effectiveness of insulin self-management.

1 | INTRODUCTION

Diabetes is a chronic disease arising as a result of insulin deficiency or despite being secreted adequately not being able to be used in the body; it requires regular patient education/support and perpetual medical care (ADA, 2013; AEMT, 2015; TSGD, 2011). Diabetes is a health problem; the significance of which has been increasing around the world and in Turkey because of its frequency and complications (AEMT, 2015; Satman et al., 2013; TSGD, 2011). According to the data of the International Diabetes Federation (IDF), the number of adults with diabetes was 415 million in 2015, and it is expected to be 642 million in 2040 (IDF, 2015).

Diabetes treatment is provided with medical and nutrition treatment, physical activity and exercise, insulin treatment, blood sugar follow-up at home, and diabetes self-management training (ADA, 2013; AEMT, 2015). Diabetes self-management training is an important building block of the treatment for all individuals with diabetes, and it provides active participation in treatment (ADA, 2016). In type 1 diabetes, there is insulin deficiency, and insulin treatment should start from diagnosis. There is no need for insulin treatment at the beginning for many with type 2 diabetes. However, insulin production decreases widely in at least one third of individual with diabetes, and in 10 years from the diagnosis they need insulin treatment (AEMT, 2015; Kabalak & Çetinalp, 2009). Insulin treatment provides optimal glucose control and maintains HbA1c (average three months blood sugar) at normal values. Studies have proved that complications related to diabetes and mortality rates are decreased by reducing HbA1c levels in individuals with type 2 diabetes (Brinke, Dekker, Groot, & Ikkersheim, 2008; Stratton et al., 2000).

Individual management of diabetes treatment is very important for the success of the treatment. Regardless of which type of diabetes mellitus, self-management of the condition is essential to bring about glycemic control (Wallston, Rothman, & Cherrington, 2007). It is very important to have knowledge and correct attitudes to carry out the skills, but diabetes self-management is complex. It can entail, for example, knowing insulin types and features, insulin treatment methods, applying their injections with the right technique, correct dose and at correct times, knowing their insulin injection sites, absorption rate of the insulin according to the site, factors affecting insulin absorption, storage conditions of the insulin, coping with the insulin complications, to adjust insulin dose according to food intake, etc. for individuals with diabetes to manage their insulin treatment successfully (Fu, Qui, & Radican, 2009; Karakurt & Kaşıkçı, 2012; Nakar, Yitzhaki, Rosenberg, & Vinker, 2007; Nam, Stotts, & Janson, 2010; Snoek, 2002).

The "self-management" concept involves knowledge and beliefs, self-regulation skills and abilities, and social facilitation to manage chronic conditions or engage in healthy behaviors (Ryan & Sawin, 2009). Therefore, knowledge, attitudes, and behaviors of individuals with diabetes related to insulin treatment should be improved by self-management training. Insulin treatment is an essential part of the diabetes treatment plan as poor management of insulin treatment causes many complications. Teaching insulin self-management to individuals with diabetes and their family is a fundamental of the self-management education. Diabetes nurses are responsible for providing necessary education to the individuals with diabetes and their family in order to avoid diabetes-related complications.

Although a great number of individuals with diabetes use insulin, most scales that measure diabetes self-management among individuals with diabetes do not include items on insulin management (Schmitt et al., 2013; Seo, Song, Choı, Kım, & Chang, 2017; Sleath et al., 2016; Sousa, Hartman, Miller, & Carroll, 2009; Wallston et al., 2007). There are several different general diabetes management scales such as the Diabetes Management Self-Efficacy Scale, the Diabetes Empowerment Scale, the Perceived Diabetes Self-Management Scale, the Diabetes Medication Self-Efficacy Questionnaire, and Diabetes Self-Management Behavior for Older Koreans (Schmitt et al., 2013; Sleath et al., 2016; Wallston et al., 2007). The scales all assess general diabetes self-management without a specific focus on insulin therapy. One scale relates to insulin treatment, the Insulin Treatment Assessment Scale (ITAS), and can be used in insulin-treated patients to assess positive and negative perceptions regarding insulin treatment and changes therein (Snoek, Skovlund, & Pouwer, 2007). Management of insulin treatment is a critical self-management skill for individuals with diabetes. There is a need for a measuring tool to determine self-management levels related to insulin treatment. This scale can be used to assess the knowledge and skill levels and positive-negative attitudes of individuals with diabetes regarding their insulin therapy. In this way, diabetes educators can plan for more effective self-management training on insulin therapy.

2 | METHODS

2.1 | Aim

The aim of this study was to develop a valid and reliable measuring tool to determine the level of self-management of insulin treatment by individuals with diabetes.

2.2 | Study design and setting

This study was planned and applied as a methodological instrument development study. Research data were collected at a training research hospital between January 2014 and June 2014. The research questions were the following:

a. Is the IT-SMS a valid and reliable measurement tool?

b. Do the psychometric characteristics of the IT-SMS indicate that it is an appropriate tool for measuring the levels of insulin self-management in individuals with diabetes?

2.3 | Sample

It is stated that the number of the questions should be at least about five times more than the amount of data at validity-reliability phase in scale development studies. Validity and reliability studies stated that the sample size should be 5 to 10 people for each scale item (Tavşancıl, 2014). In the present study, the draft scale consisted of 58 items. Accordingly, the number of sample was determined to be at least 290. Individuals with diabetes who applied to the diabetes clinic of the hospital were invited to the study. The sample of the study included 311 individuals with diabetes who accepted the offer to participate in the study. Criteria for inclusion in the sample were being 18 to 65 years old, literate, not having any physical disability like visual impairment, hearing impairment, or mental/cognitive problem, and receiving insulin treatment for at least 1 year (3 times or more in a day).

2.4 | Data collecting and measurements

Data were collected by the researcher in face-to-face meetings. Data were collected by the researcher via a Demography Data Form and the Insulin Treatment Self-Management Scale (IT-SMS). The Demography Data Form was prepared by the researchers and included sociodemographic variables, disease-related characteristics, and variables related to metabolic control outcomes. The development process of Insulin Treatment Self-Management Scale (IT-SMS) is presented below.

2.4.1 | Formation of the item pool

During the process of the development of the scale, literature on self-management in insulin therapy for diabetes was reviewed in detail. An item pool was assembled, including some items inspired by the Insulin Treatment Appraisal Scale (ITAS) and the Diabetes Attitude Scale (DAS) (Anderson, Fitzgerald, Funnell, & Gruppen, 1998; Snoek et al., 2007). As the concept of self-management incorporated knowledge, belief, self-regulation skills, and abilities, the items were written specific to these cognitive, affective, and behavioral areas. The item pool was formed with 63 items. The scale had a five-point Likert-type format with responses as “Absolutely Disagree” (1), “Disagree” (2), “Undecided” (3), “Agree” (4), and “Absolutely Agree” (5).

2.4.2 | Content validity

While testing the content validity of the scale, the items were submitted for the opinions of 14 experts to understand whether they were comprehensible. Experts assessed items with a rating scale of 1: Should be abolished, 2: Should be corrected, and 3: Suitable. The experts consisted of clinicians and academic nurses who study the subject. The data that were obtained from the expert opinions were analyzed by the Lawshe method. Content Validity Ratios (CVR) of items were calculated in the Lawshe analysis. Eight items with low CVR were excluded from the scale. In accordance with the expert advice, five items were corrected and four items were added. Consequently, the draft scale with 58 items was scored using a five-point Likert type scale ranging from 1: Strongly disagree to 5: Strongly agree.

2.4.3 | Face validity

Regarding scale development studies, the literature suggests that the outline of the scale should be tested with a similar sample group (Berberoğlu, 2012). Following the language and content validity, pre-application of the draft scale was conducted with 15 individuals with diabetes. According to the pre-application results, the intelligibility of each item was good, and there was no need to modify any item.

2.5 | Data analysis

Content validity was performed by the expert opinion, and construct validity was performed by factor analysis as part of the validity analyses of the scale. Expert opinion was evaluated by the Lawshe analysis. During the factor analysis process, Kaiser-Meyer-Olkin (KMO) and Bartlett values were determined, and the varimax rotation procedure was applied. The Pearson correlation test was employed in line with internal consistency analysis, item total point correlation, split half method, and test-retest for reliability analyses.

2.6 | Ethical consideration

This study was approved by the ethical review boards at the authors' institution (09.2013.0969). The necessary permissions were obtained so that the study could be conducted in the hospital.

3 | RESULTS

3.1 | Sample

The sample of the study consisted of 311 individuals with diabetes. Of participants, 36 (11.6%) had type 1 diabetes and 275 (88.4%) had type 2 diabetes. The average age of the individuals participating in the research was 53.5 (SD 11.32) years; 174 (55.9%) were female and 137 (44.1%) male. The majority of participants (79.7%) were primary school graduates.

3.2 | Construct validity

The construct validity of the Insulin Treatment Self-Management Scale was tested by exploratory factor analysis. First, KMO tests were conducted in order to determine the suitability of the sample size and data to the factor analysis. The KMO value was 0.88, and Barlett's value was $P < .001$. In exploratory factor analysis, it was assumed that eigen values of the items would be at least 1.00, factor load values of the items would be at least 0.45, and in items having adequate factor load value between two different factors, the difference would be at least 0.20 (Seçer, 2015). Analysis was undertaken using exploratory factor analysis by using the varimax rotation technique. Twenty items which had article load values under 0.45, and one item loading on more than one factor, were removed from the scale following the factor analysis.

Consequently, a three factor solution was demonstrated, explaining 52.1% of the variance. The "scree plot" graph reveals the factor structure of the scale (Figure 1), demonstrating items distributed in accordance with the theoretical structure. It was determined that the first factor consisted of 17 items, the second factor consisted of 7 items, and the third factor consisted of 8 items. Accordingly, the first factor was called the *Behavioral Subdimension*, the second *Cognitive Subdimension*, and the third *Affective Subdimension*. The items of the Affective Subdimension and "item 10" should be analyzed by reverse coding since they contained negative meaning. Increasing values obtained in all subdimensions showed increasing self-management levels concerning the related dimension. Findings derived from the exploratory factor analysis are given in Table 1.

3.3 | Reliability

Item-total item-rest correlation, internal consistency, split half reliability, and test-retest test analyses were practiced in order to examine the reliability of the Insulin Treatment Self-Management Scale. Firstly, item-total correlations were evaluated, and five items with item-total correlation of less than 0.30 were excluded from the scale. It was determined that item-total correlations of 32 items changed between 0.332 and 0.640 (Table 1). The Cronbach's alpha value was examined to determine the internal consistency of the scale, and Spearman Brown and Guttman values were examined to determine its split half reliability. Cronbach's alpha, Spearman Brown, and Guttman values for both total and each subdimensions were presented in Table 2. Cronbach's alpha value of the total scale was calculated as 0.91, Spearman Brown value as 0.87, and Guttman value as 0.87. It was determined that Cronbach alpha values of the subdimensions were, respectively, 0.87, 0.88, and 0.86.

Test-retest was conducted on 37 individuals with diabetes who could be reached again after 2 to 4 weeks. The results of the test-retest test practice performed for the reliability analysis of the scale were given in Table 2. In consequence of the Pearson analysis examining the points obtained from the test-retest test practice within the reliability analyses of the Insulin Treatment Self-Management Scale, results for behavioral, affective, and cognitive subdimensions were found positive and significant (respectively, $r = 0.96$, $r = 0.92$, $r = 0.93$; $P < .001$).

4 | DISCUSSION

Insulin treatment is the only treatment option for people with type 1 diabetes, whereas insulin treatment is started when there is no response to oral hypoglycemic agents in patients with type 2 diabetes (Rubino, McQuay, Gough, Kvasz, & Tennis, 2007). Among the diabetes patients throughout the world, 40% of type 2 diabetes patients need insulin treatment (CDC, 2015). Accordingly, around half the patients with diabetes in the world are thought to receive insulin treatment. However, it is claimed that patients do not start insulin treatment as early as required and that they do not take sufficient insulin

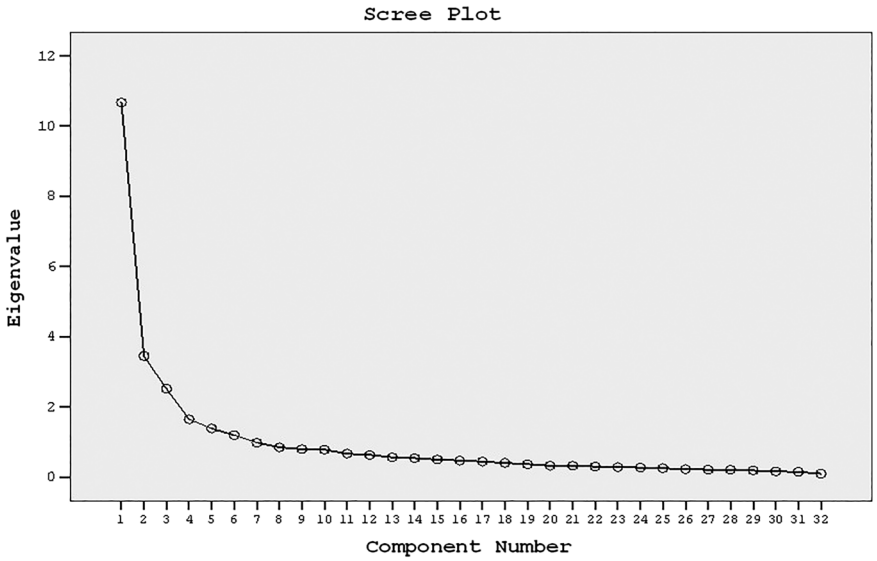

FIGURE 1 Scree plot chart of the scale

TABLE 1 Insulin Treatment Self-Management Scale item factor loading, item-total correlations, item distinctiveness, and the variances explained

Items	Factors			Item-Total Correlation[a]	t (Lower 27%-Upper 27%)[b]
	1	2	3		
Item14: I keep my insulin in appropriate conditions.	0.838			0.556	−9.52*
Item11: It is important to keep the insulin in suitable conditions.	0.836			0.552	−10.15*
Item12: Insulin treatment allows blood sugar to be kept in normal values.	0.758			0.599	−11.36*
Item3: Diabetes training is quite important in insulin treatment management.	0.739			0.605	−10.45*
Item9: I inject insulin as I was taught.	0.711			0.571	−11.62*
Item18: It is important to adjust insulin dose according to the blood sugar.	0.675			0.640	−11.85*
Item 8: I can successfully manage my insulin therapy by training regularly.	0.673			0.708	−14.22*
Item22: I am happy I have brought diabetes under control by the insulin treatment.	0.563			0.538	−9.11*
Item55: I only use the needle tips once.	0.560			0.552	−11.78*
Item53: I regularly change the sites that I inject insulin.	0.558			0.474	−9.74*
Item2: I inject my insulin at the recommended times.	0.556			0.567	−10.48*
Item 58: Insulin injection sites should be checked at regularly.	0.554			0.632	−10.94*
Item54: I inject my insulin on a different site every time.	0.525			0.541	−10.12*
Item 15: I can adjust my insulin dose according to my blood sugar.	0.507			0.573	−12.28*
Item 56: It is inconvenient to make insulin injection over the clothes.	0.503			0.487	−9.46*
Item 36: Insulin delays the occurrence of damage caused by diabetes.	0.476			0.524	−9.22*
[c]Item 10: I don't inject insulin myself.	0.472			0.590	−10.36*
Item32: I know what I need to do to prevent the problems that may occur as a result of insulin injection.		0.846		0.619	−14.89*
Item31: I know problems that may occur as a result of insulin injection.		0.845		0.591	−13.33*
Item19: I know what may occur if I inject insulin in the wrong way.		0.797		0.497	−11.20*
Item33: I have been participating diabetes training regularly since I started the insulin treatment.		0.701		0.619	−7.87*
Item 35: I know that I can prevent the harm caused by diabetes by using insulin.		0.674		0.531	−11.44*
Item37: I know what to do when my blood sugar drops heavily.		0.630		0.502	−8.64*
Item 39: I can better control my diabetes by using insulin.		0.537		0.573	−9.98*
[c]Item 49: My heart rate increases, when my insulin injection time approaches.			0.795	0.388	−7.00*
[c]Item25: I feel fear when injecting insulin.			0.784	0.458	−7.60*
[c]Item26: I feel down when injecting insulin.			0.775	0.425	−6.95*
[c]Item52: I panic when I inject insulin.			0.719	0.464	−8.10*
[c]Item27: I fear to be hurt while injecting insulin.			0.671	0.332	−5.55*
[c]Item 51: I don't have the guts to inject insulin myself.			0.634	0.536	−8.93*
[c]Item48:I am unhappy to have to use insulin.			0.618	0.407	−7.44*

(Continues)

TABLE 1 (Continued)

Items	Factors 1	2	3	Item-Total Correlation[a]	t (Lower 27%-Upper 27%)[b]
[c]Item47: I delay insulin injection times with some excuses.			0.573	0.382	–4.75*
Variances explained					
1	33.4%				
2	10.8%				
3	7.9%				
Total	52.1%				

[a]n = 311
[b]$n_1 = n_2 = 84$
[c]Reverse item
*$P < .001$

TABLE 2 Reliability analysis results

Subdimensions	Cronbach's Alpha Coefficient	Spearman Brown Coefficient	Guttman Split Half Coefficient	Test-Retest r [a]	Test-Retest P*
Behavioral	0.87	85	85	0.96	<.001
Cognitive	0.88	82	82	0.92	<.001
Affective	0.86	79	79	0.93	<.001
Total Scale	0.91	.87	87	0.97	<.001

[a]Pearson correlation test
*$P < .001$

considering their glycemic values (Brod, Kongso, Lessard, & Christensen, 2009). To start insulin therapy is a very difficult and important choice for people with diabetes. However, regular management of treatment is affected by many factors (Bahrmann et al., 2014; Brod et al., 2009). These include believing that the illness worsens, having the feeling of failure, experiencing injection anxiety, perceiving insulin treatment to be ineffective, worrying about gaining weight, being concerned about hypoglycemia, lacking confidence, worrying about family and social pressure, and worrying about exposure to obstacles involving colleagues and friends (Brod et al., 2009; Peyrot, Rubin, & Khunti, 2010; Petrak, Herpertz, Stridde, & Pfützner, 2013; Fu, Wong, Chin, & Luk, 2016). Evaluation of the perceptions, knowledge, and skills of patients with diabetes is thought to allow planning of effective intervention to develop self-management and behavioral changes in these patients. Therefore, the Insulin Treatment Self-Management Scale was developed to support this.

The construct validity of the Insulin Treatment Self-Management Scale was tested by exploratory factor analysis. The load value obtained in factor analysis is the critical value to determine whether an item will be in any particular subdimension. The load value of an item is usually expected to be 0.45 or over. However, it is stated that this value can be degraded to 0.30. On the other hand, if an item has a value of 0.32 or over in more than one dimension, then it is expected that there will be a difference of at least 0.10 or ideally 0.20 between the load values that the item has in two dimensions. If there is a value of under 0.10 between the load values of an item in two different factors, it is stated that the item is an "overlapping item" and it should be removed from the scale (Seçer, 2015; Şencan, 2005). In total, 21 items with item load value of under 0.45 and loading on more than one factor were removed from the scale. The load values of items are important in terms of showing their power of representativeness in the scale. Removing items with load values lower than 0.45 from the scale may be important to strengthen the structure of the scale.

The correlation values of all items laid between 0.332 and 0.640. It is stated that if item-total correlation value is.30 and over, then items are adequate to distinguish the feature to be measured, and they are in accordance with the scale total (Büyüköztürk, 2009; Seçer, 2015). When the item-total correlations of the items in the scale were examined, it was established that their distinguishing features were generally high.

Alpha reliability coefficient is an ideal internal consistency detection technique for Likert scales and shows the conformity of the items in the scale with each other. Split half reliability method is a reliability detection method performed as being based on the basis of dividing the test into two equal parts and that the relation between the two equal parts is calculated with Spearman Brown correlation coefficient. It is expected that the relation between the two equal halves will be significant and high. If reliability values are 0.70 and over during the scale development and adaption processes, it shows that the scale has adequate reliability (Seçer, 2015). Accordingly, it is seen that the scale

has internal consistency since Cronbach's Alpha, Spearman Brown, and Guttman values are 0.70 and over for the whole scale and its subdimensions.

Another method employed for the reliability analysis of the scale is test-retest test practice. Results for the affective, behavioral, and cognitive subdimensions of the Insulin Treatment Self-Management Scale were positive and significant. Correlation values over 0.70 are expected in test-retest test method, used to measure the invariance of the scale by time (Seçer, 2015). However, correlation values between 0.70 and 1.00 indicate high correlation (Büyüköztürk, 2009). Accordingly, it was established that there was a high level significant relation between the test-retest test results for the whole scale and its subdimensions.

4.1 | Scoring of the scale

The scale has 32 items, with a three-factor structure, scored using a five-point Likert type scale. The behavioral subdimension consists of 17 items, with a score ranging from 17 to 85. The cognitive subdimension consists of 7 items, with a score ranging from 7 to 35. The affective subdimension consists of 8 items, with a score ranging from 8 to 40. Items included in the affective subdimension and the item "I don't insulin inject myself" should be analyzed by reverse coding since they contain negative meaning. Increasing the score obtained in all subdimensions represents increasing levels of self-management in that dimension (Appendix I).

4.2 | Limitations

This study had several limitations. First, this study was conducted in only one training research hospital, limiting the sample group. In addition, only 37 patients were able to be reached for the test-retest application. The concurrent method was not available because there is no similar scale in the Turkish version.

5 | CONCLUSIONS

The findings revealed that the Insulin Treatment Self-Management Scale was a valid and reliable measurement tool. Diabetes educators can identify the presence or lack of knowledge and skills of individuals with diabetes, and their attitudes about insulin treatment using this scale. In this way, they can plan and perform more targeted and individually useful patient education, which may enhance the effectiveness of insulin therapy. In addition, since there is not any similar scale in literature, it is available for future studies in this area.

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CONFLICT OF INTEREST

The authors declare no financial or personal interests that could bias the work.

AUTHORSHIP STATEMENT

(GKO, ŞEA) designed the study. (GKO, SKA) collected the data. (GKO) analyzed the data. (GKO, SKA, ŞEA) prepared the manuscript. All authors approved the final version for submission.

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APPENDIX A

THE INSULIN TREATMENT SELF-MANAGEMENT SCALE ENGLISH VERSION

DIRECTIONS: The statements given below evaluate your self-management for insulin therapy. There is no right or wrong answer. You select the option that suits you.

Items	Strongly disagree	Disagree	Neutral	Agree	Strongly disagree
1. I keep my insulin in appropriate conditions.	1	2	3	4	5
2. It is important to keep the insulin in suitable conditions.	1	2	3	4	5
3. Insulin treatment allows blood sugar to be kept within normal values.	1	2	3	4	5
4. Diabetes training is quite important in insulin treatment management.	1	2	3	4	5
5. I inject insulin as I was taught.	1	2	3	4	5
6. It is important to adjust insulin dose according to the blood sugar.	1	2	3	4	5
	1	2	3	4	5

(Continues)

Items	Strongly disagree	Disagree	Neutral	Agree	Strongly disagree
7. I can successfully manage my insulin therapy by training regularly.					
8. I am happy I have brought diabetes under control by insulin treatment.	1	2	3	4	5
9. I only use the needle tips once.	1	2	3	4	5
10. I regularly change the sites that I inject insulin.	1	2	3	4	5
11. I inject my insulin at the recommended times.	1	2	3	4	5
12. Insulin injection sites should be checked regularly.	1	2	3	4	5
13. I inject my insulin on a different site every time.	1	2	3	4	5
14. I can adjust my insulin dose according to my blood sugar.	1	2	3	4	5
15. It is inconvenient to make insulin injection over the clothes.	1	2	3	4	5
16. Insulin delays the occurrence of damage caused by diabetes.	1	2	3	4	5
17. I don't inject insulin myself.	1	2	3	4	5
18. I know what I need to do to prevent the problems that may occur as a result of insulin injection.	1	2	3	4	5
19. I know problems that may occur as a result of insulin injection.	1	2	3	4	5
20. I know what may occur if I inject insulin in the wrong way.	1	2	3	4	5
21. I have been participating in diabetes training regularly since I started the insulin treatment.	1	2	3	4	5
22. I know that I can prevent the harm caused by diabetes by using insulin.	1	2	3	4	5
23. I know what to do when my blood sugar drops heavily.	1	2	3	4	5
24. I can better control my diabetes by using insulin.	1	2	3	4	5
25. My heart rate increases, when my insulin injection time approaches.	1	2	3	4	5
26. I feel fear when injecting insulin.	1	2	3	4	5
27. I feel down when injecting insulin.	1	2	3	4	5
28. I panic when I inject insulin.	1	2	3	4	5
29. I fear to be hurt while injecting insulin.	1	2	3	4	5
30. I don't have the guts to inject insulin myself.	1	2	3	4	5
31. I am unhappy to have to use insulin.	1	2	3	4	5
32. I delay insulin injection times with some excuses.	1	2	3	4	5

APPENDIX B

THE INSULIN TREATMENT SELF-MANAGEMENT SCALE
TURKISH VERSION İNSÜLİN TEDAVİSİ ÖZ-YÖNETİM ÖLÇEĞİ

YÖNERGE: Aşağida insülin tedavisi öz-yönetim düzeyinizi değerlendirmek için ifadeler verilmiştir. Doğru ya da yanlış cevap yoktur. Size en uygun seçeneği işaretleyiniz.

Maddeler	Tamamen katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Tamamen katılıyorum
1. İnsülinlerimi uygun koşullarda saklarım.	1	2	3	4	5
2. İnsülinleri uygun koşullarda saklamak önemlidir.	1	2	3	4	5
3. İnsülin tedavisi kan şekerinin normal değerlerde sürdürülmesini sağlar.	1	2	3	4	5
4. İnsülin enjeksiyonumu öğretildiği şekilde yaparım.	1	2	3	4	5
5. Diyabet eğitimi insülin tedavisinin yönetiminde oldukça önemlidir.	1	2	3	4	5
6. Kan şekeri sonucuna göre insülin dozunu ayarlayabilmek önemlidir.	1	2	3	4	5
7. Düzenli aralıklarla eğitim alarak insülin tedavimi başarıyla yönetebilirim.	1	2	3	4	5
8. İnsülin tedavisi ile diyabetimi kontrol altına aldığım için mutluyum.	1	2	3	4	5
9. İğne uçlarını sadece bir kez kullanırım.	1	2	3	4	5
10. İnsülin enjeksiyonu yaptığım bölgeleri düzenli olarak değiştiririm.	1	2	3	4	5
11. İnsülin enjeksiyonumu bana önerilen zamanlarda yaparım.	1	2	3	4	5
12. İnsülin enjeksiyon bölgeleri düzenli aralıklarla kontrol edilmelidir.	1	2	3	4	5
13. İnsülin enjeksiyonumu her seferinde farklı bir bölgeye yaparım.	1	2	3	4	5
14. Kan şekerime göre insülin dozumu ayarlayabilirim.	1	2	3	4	5
15. İnsülin enjeksiyonunu kıyafetlerin üzerinden yapmak sakıncalıdır.	1	2	3	4	5
16. İnsülin diyabetin yol açacağı zararların ortaya çıkmasını geciktirir.	1	2	3	4	5
17. Kendi kendime insülin enjeksiyonu yapmam.	1	2	3	4	5
18. İnsülin enjeksiyonu sonucu oluşabilecek sorunları önlemek için yapmam gerekenleri bilirim.	1	2	3	4	5
19. İnsülin enjeksiyonu sonucu oluşabilecek sorunları bilirim.	1	2	3	4	5
20. İnsülin enjeksiyonu sonucu oluşabilecek sorunları önlemek için yapmam gerekenleri bilirim.	1	2	3	4	5
21. İnsülin tedavisine başladığımdan beri düzenli olarak diyabet eğitimlerine katılırım.	1	2	3	4	5
22. İnsülin kullanarak diyabetin yol açacağı zararları önleyebileceğimi biliyorum.	1	2	3	4	5
23. Kan şekerim aşırı derecede düştüğünde ne yapacağımı bilirim.	1	2	3	4	5
24. İnsülin kullanarak diyabetimi daha iyi kontrol altına alabilirim.	1	2	3	4	5

(Continues)

Maddeler	Tamamen katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Tamamen katılıyorum
25. İnsülin enjeksiyon zamanım yaklaştığında kalp atışlarım hızlanır.	1	2	3	4	5
26. İnsülin enjeksiyonu yaparken korku duyarım.	1	2	3	4	5
27. İnsülin enjeksiyonu yapacağım zaman keyfim kaçar.	1	2	3	4	5
28. İnsülin enjeksiyonu yapacağım zaman paniklerim.	1	2	3	4	5
29. İnsülin enjeksiyonu yaparken canımın yanmasından korkarım.	1	2	3	4	5
30. Kendi kendime insülin enjeksiyonu yapacak cesaretim yok.	1	2	3	4	5
31. İnsülin kullanmak zorunda olduğum için mutsuzum.	1	2	3	4	5
32. İnsülin enjeksiyon saatlerimi çeşitli bahanelerle geciktiririm.	1	2	3	4	5