



Investigating the Relationship Between Insulin Perceptions and Diabetes Self-Management of Intensive Care Patients with Type 2 Diabetes

Yoğun Bakıma Yatan Tip 2 Diyabetli Hastaların İnsüline Karşı Algıları ile Diyabet Öz Yönetimleri Arasındaki İlişkinin İncelenmesi

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Abstract

Aim: This study aimed to determine the level of perception of insulin and diabetes symptom management of patients with Type 2 diabetes who received inpatient treatment in intensive care.

Material and Method: This descriptive study was conducted in the Internal Medicine and Anesthesia Intensive Care units of a state hospital during the period of December 01, 2020 and March 31, 2021. The sample of the study was composed of 100 voluntary patients who used insulin. Research data were collected via the Patient Introduction Form, Diabetes Self-Management Questionnaire and the Insulin Treatment Appraisal Scale. Written permission was obtained from ethics committee and patients. The data analysis consisted of arithmetic mean, number, percentage, Spearman's Correlation, Mann Whitney U and Kruskal Wallis tests.

Results: The average age of the patients was 44.57±14.8, 52% were female, 72% were single. The mean duration of insulin use was 2.8±1.17 years. Patients' Insulin Treatment Appraisal positive and negative item subscale mean scores were 12.56±3.43 and 48.18±12.09, respectively. Patients' mean Diabetes Self-Management Questionnaire total score was 4.07±1.74 (range: 0.62-8.75). There was a significant difference between the marital status, education level, existence of chronic disease and complications, regular use of insulin and Diabetes Self-Management Questionnaire and Insulin Treatment Appraisal Scale scores.

Conclusion: Patients have a high negative perception towards insulin use and their diabetes self-management is below the average. There was a high level of negative correlation between patients' negative insulin perception and glucose management and diet control sub-dimensions of their diabetes self-management. Accordingly, it is recommended to plan individual or group trainings in order to raise awareness about diabetes self management and patients' insulin treatment.

Keywords: Insulin Perceptions, Self-Management, Type 2 Diabetes Mellitus

Öz

Amaç: Bu çalışma ile yoğun bakımda yatarak tedavi gören Tip 2 diyabet hastalarının insüline karşı algıları ve diyabet semptom yönetim düzeyinin belirlenmesi sağlanacaktır.

Gereç ve Yöntem: Tanımlayıcı olan bu çalışma 1 Aralık 2020 ve 31 Mart 2021 tarihleri arasında bir devlet hastanesinin Dahiliye ve Anestezi Yoğun Bakım ünitelerinde gerçekleştirilmiştir. Çalışmanın örneklemini insülin kullanan 100 gönüllü hasta oluşturmuştur. Araştırma verileri Hasta Tanıtım Formu, İnsülin Tedavisi Değerlendirme Ölçeği ve Diyabet Öz Yönetim Skalası ile toplandı. Araştırmanın etik kurul izni ve hastalardan yazılı izin alındı. Verilerin analizi, aritmetik ortalama, sayı, yüzde, korelasyon, Mann Whitney U ve Kruskal- Wallis testleri kullanılarak yapıldı.

Bulgular: Hastaların yaş ortalaması 44,57±14,8 olup, %52'si kadındır. Hastaların insülin kullanma yıl ortalaması 2,8±1,17 yıldır. Hastaların Diyabet Öz Yönetim Skalasından aldıkları toplam puan ortalamaları 4,07±1,74'tür (0,62-8,75). Hastaların İnsülin Tedavisi Değerlendirme Ölçeği pozitif ve negatif madde alt boyutu puan ortalamaları sırasıyla 12,56±3,43; 48,18±12,09'dur. Hastaların medeni durumu, eğitim düzeyi, kronik hastalık ve komplikasyon varlığı, düzenli insülin kullanımı ile Diyabet Öz Yönetim Skalası ve İnsülin Tedavisi Değerlendirme Ölçeği puan ortalamaları arasında anlamlı bir fark olduğu saptandı.

Sonuç: İnsülin kullanan Tip 2 diyabetli hastaların insülin kullanımına karşı negatif algısının fazla olduğu ve diyabet öz yönetimlerinin ortalamanın altında olduğu bulunmuştur. Hastaların negatif insülin algısı ile diyabet öz yönetiminin glikoz yönetimi ve diyet kontrolü alt boyutları arasında yüksek düzeyde negatif ilişki bulunmuştur. Hastaların diyabet öz yönetimi ve insülin tedavisine yönelik farkındalık oluşturulması amacıyla bireysel veya grup eğitimlerinin planlanması önerilmektedir.

Anahtar Kelimeler: İnsülin Algısı, Öz Yönetim, Tip 2 Diyabet



INTRODUCTION

Type 2 Diabetes Mellitus (T2DM), which accounts for approximately 90% of all diabetics, is a metabolic syndrome characterized by hyperglycemia as a result of insulin resistance and impaired insulin secretion.^[1-3] The incidence of T2DM is gradually increasing due to obesity and sedentary life. According to the International Diabetes Federation Diabetes Atlas 2019 data; the estimated number of diabetic patients in the world is approximately 463 million and this number will reach 700 million by 2045. Based on these data, Turkey is expected to be among the top 10 countries with the highest number of people with diabetes in the year 2045.^[1,4]

When diabetes is not controlled, it causes complications in many parts of the body, leading to frequent hospitalizations and premature death. According to IDF (International Diabetes Federation) data, approximately 4.2 million adults between the ages of 20-79 died due to diabetes and its complications in 2019.^[1] The worldwide increase in diabetes mellitus and the related complications such as hypoglycemia, diabetic ketoacidosis, retinopathy, nephropathy, neuropathy and diabetic foot show the importance of diabetes self-management. Self management in diabetes includes the self-care behaviors that ensure compliance with the use of medication, medical nutrition therapy, and physical activity. Individuals with diabetes should have knowledge and acquire self-care skills to ensure self-management.^[5] It is imperative to transform self-management skills into a lifestyle to keep uncontrollable blood glucose, which is the main problem in individuals with diabetes, within normal limits and to prevent further complications.^[6] Learning self-care skills will facilitate their adaptation to treatment by providing them with the skills to cope with the disease and getting more satisfaction from life.^[6,7]

Insulin is reported as the most effective treatment method in the treatment of hyperglycemia.^[8] Studies have shown that insulin therapy is effective in slowing down the development and progression of chronic complications of diabetes.^[9,10] More than half of patients with type 2 diabetes need insulin therapy after 5 years. Despite the importance of insulin therapy, many patients with type 2 diabetes are unwilling or afraid of insulin therapy. This negative perception of insulin therapy is called "psychological insulin resistance".^[11,12] Studies have reported that approximately 40-70% of patients with type 2 diabetes refuse insulin therapy.^[12,13] Patients may be resistant to insulin use due to reasons such as pain, hypoglycemia, accelerated weight gain, feelings of inadequacy and ineffectiveness in individuals as a result of decreased independence, and feelings of embarrassment in the community related to using insulin.^[14-16]

The sooner diabetes management training is initiated, the lower will be the rate of complications and associated mortality. It has been observed that diabetic patients spend their lives more comfortably, acquire self-efficacy and enjoy a higher quality of life with successful symptom management.^[17-19] Also, the literature reports that it is necessary to evaluate the

negative and positive perceptions of individuals with T2DM about insulin treatment before or after starting treatment.^[5,20] Evaluating the perceptions of diabetic patients will facilitate the planning of effective interventions for symptom management and behavioral change. This study aimed to determine the level of diabetes symptom management of patients with T2DM who received inpatient treatment in intensive care. In addition, the study explored the relationship between patients' insulin perceptions and their diabetes self-management.

MATERIAL AND METHOD

This study was conducted in the Internal Medicine and Anesthesia Intensive Care units of a state hospital during the period of December 01, 2020 and March 31, 2021. The study universe consisted of the patients hospitalized with the diagnosis of T2DM in the mentioned clinics of the hospital (N=150). The sample of the study was composed of 100 voluntary patients who had sufficient awareness to answer questionnaire and scale questions and who used insulin.

Data Collection

Written consent was obtained from the patients who volunteered to participate in the study by having them sign the informed consent form. The patients who gave written consent were asked to fill out the Patient Introduction Form, Diabetes Self-Management Questionnaire (DSMQ) and Insulin Treatment Appraisal Scale (ITAS).

Patient Introduction Form: In form has a total of 13 questions about patient's age, gender, education level, socioeconomic level, height, weight, the duration of insulin use, who implemented the insulin treatment, whether the insulin treatment was regular, the existence of any chronic complications, existence of any other chronic diseases and how the patient felt when diagnosed with diabetes. This form was prepared by the researcher in line with the literature.^[5,8,17,21]

Insulin Treatment Appraisal Scale: ITAS was developed by Snoek et al.^[22] and its validity and reliability study was carried out by Surucu et al.^[5] in Turkey. ITAS is a 5-item Likert-type scale with 20 items. The rating scale was designed as a Likert type scale with the options ranging from "strongly disagree" (1 point) to "strongly agree" (5 points). The scale consists of 2 sub-dimensions with 4 positive items (3,8,17,19) and 16 negative items. When the scale is scored, positive items are scored in reverse. The sum of the four positively expressed items (4-20) provides the positive evaluation sub-dimension while the sum of 16 negatively expressed items (16-80) provides the negative evaluation sub-dimension. Total scale score is obtained by adding the 16 items with negative expressions and the four items with positive expressions after they are reversed. The total of all the items (20 items) provides the total score (20-100). The scale has no cut-off point. A high positive evaluation score indicates a high positive appraisal towards insulin, while a high negative evaluation score indicates a negative perception of insulin use.^[5,22] The internal consistency analysis of the scale

(Cronbach's Alpha) was found to be 0.905 in our study and 0.80 in Surucu et al.^[5]

Diabetes Self-Management Questionnaire (DSMQ): DSMQ was developed by Schmitt et al.^[23] in 2013 and the validity and reliability study of the scale was carried out by Eroğlu and Sabuncu^[17] in Turkey. The scale is a 4-point Likert type scale with 16 items. The rating scale was designed as a Likert type scale with the options ranging from “does not apply to me all” (0 points) to “applies to me very much” (3 points). The scale consists of 4 sub-dimensions: Glucose Management (GM), Dietary Control (DC), Physical Activity (PA) and Healthcare Use (HU). In DSMQ, 7 items are calculated as they are and 9 items are calculated in reverse (Item total score obtained from the total scale or sub-dimension) / (Maximum item total score that can be obtained from the total scale or sub-dimension) x10) For unanswered questions, 3 points are subtracted from the maximum item total score that can be obtained from the total scale or sub-dimension. A minimum of 0 and a maximum of 10 points can be obtained from the scale. If an item is omitted, it is evaluated as -3 points. As the score gets closer to 10, diabetes self-management increases.^[17,23] Internal consistency analysis of the scale (Cronbach's Alpha) was found 0.899 in our study and 0.85 in Eroğlu and Sabuncu.^[17]

Ethical Declarations: To ensure compliance with ethical principles, written permission for non-interventional clinical research was obtained from the ethics committee (12/10/2020-90/72) and the institution (Number=E-44021967-605.01) where the study was conducted. The patients who were included in the study were informed about the study and their written permission to participate in the study was obtained. Written permission was obtained from authors, who conducted the Turkish validity and reliability study to use the scale in the study.

Data Analysis: The study data were analyzed with the SPSS 20.0 statistical program. Mean, standard deviation, number-percentage distributions were used to evaluate the descriptive characteristics of the patients. The Kolmogorov-Smirnov test was used to analyze whether the data were suitable for normal distribution. Spearman's Correlation Analysis was performed for correlation analysis. Mann Whitney U test and Kruskal Wallis test were used to evaluate the difference between ITAS and DSMQ mean scores according to independent variables. P values <0.05 were considered significant.

RESULTS

The mean age of the patients included in the study was 44.57±14.8. 52% were women, 72% were single, 47% were primary school graduates, 52% had a chronic disease other than T2DM, and 51% had a chronic complication related to T2DM. The mean body mass index (BMI) of the patients was 23.31±3.04 kg/m². The mean duration of insulin use was 2.8±1.17 years (range 1-4). It was found that 71% of the patients administered insulin on their own and 68% did not apply insulin regularly (**Table 1**).

Table 1. Distribution of the participants according to their sociodemographic and insulin usage characteristics (n=100)

	n	%
Age (M±SD)	44.57±14.84 (20-78)	
BMI (kg/m ²) (M±SD)	23.31±3.04 (17-34)	
Gender		
Female	52	52
Male	48	48
Marital status		
Single	28	28
Married	72	72
Education level		
Primary school	47	47
High school	36	36
University	17	17
Complication		
Yes	51	51
No	49	49
Chronic disease		
Yes	52	52
No	48	48
Administering insulin		
Itself	71	71
Family	14	14
Other	15	15
Regular use of insulin		
Yes	32	32
No	68	68
Insulin duration (years) (M±SD)	2.8 ± 1.17 (1-4)	

Note. M=Mean, SD=standard deviation, BMI= Body mass index

Patients' mean DSMQ total score was 4.07±1.74 (range 0.62-8.75). Table 2 presents the mean scores of the sub-dimensions. Patients' ITAS positive and negative item subscale mean scores were 12.56±3.43 and 48.18±12.09, respectively (**Table 2**).

Table 2. Patients' DSMQ and ITAS total and sub-dimension mean scores (n=100)

	M	SD	Min	Max
DSMQ				
GM	3.62	2.63	0	10
DC	4.21	2.44	0	10
FA	4.42	2.52	0	8.89
HU	4.41	1.42	1.11	7.78
Total	4.07	1.74	0.62	8.75
ITAS				
Positive	12.56	3.43	4	19
Negative	48.18	12.09	24	65

Note. DSMQ= Diabetes Self-Management Questionnaire, GM=Glucose Management, DC=Dietary Control, PA=Physical Activity and HU=Healthcare Use, ITAS=Insulin Treatment Appraisal Scale, M=Mean, SD=standard deviation

There was no significant difference between DSMQ and ITAS total and subscale scores according to age and gender (p>0.05). University graduate patients had higher DSMQ total and subscale scores compared to the primary and high school graduates (p<0.001). It was found that total DSMQ total and all

subscale mean scores of the married patients were higher and lower ITAS negative item mean score compared to the scores of the single patients ($p<0.001$). DSMQ total and all subscale mean scores and ITAS positive item subscale scores of the patients with complications were statistically significantly higher compared to those without complications ($p<0.05$). Patients with chronic disease had higher DSMQ total and all subscale and ITAS positive item scores compared to the

patients without chronic disease ($p<0.001$). ITAS positive item sub-dimension mean scores were found to be high while ITAS negative item sub-dimension was found to be lower in patients who regularly used insulin compared to those who did not use it regularly ($p<0.001$). It was found that DSMQ total and GM, DC, HU subscale scores of patients who used insulin regularly were higher than those who did not have regular use ($p<0.001$) (Table 3).

Table 3. DSMQ and ITAS Total and Sub-Dimensional Scores by Independent Variables

	DSMQ									
	GM		DM		FA		HU		Total scale	
	Median	M±Sd	Median	X̄±Ss	Median	Median	X̄±Ss	X̄±Ss	Median	X̄±Ss
Education level										
Primary school	63.16	4.5±2.42	63.86	5.23±2.05	38.09	3.33±1.75	63.26	5.01±1.24	61.24	4.56±1.48
High school	47.07	3.43±2.72	46.57	3.98±2.43	62.76	5.49±2.27	45.51	4.2±1.38	50.21	4.13±1.85
University	22.76	1.61±1.8	21.88	1.86±1.68	58.85	5.16±3.53	25.79	3.2±1.03	21.41	2.56±1.33
	x ² =25.364, p<0.001		x ² =27.831, p<0.001		x ² =18.407, p<0.001		x ² =24.167, p<0.001		x ² =23.631, p<0.001	
Marital status										
Married	60.9	4.44±2.62	61.98	5.14±2.14	61.25	5.4±3.25	60.17	4.88±1.3	60.98	4.63±1.63
Single	23.77	1.52±1.02	20.98	1.82±1.24	46.32	4.04±2.07	25.62	3.21±0.92	23.55	2.63±1.02
	Z=-5.789, p<0.001		Z=-6.421, p<0.001		Z=-2.444, p<0.001		Z=-5.544, p<0.001		Z=-5.803, p<0.001	
Complication										
Yes	56.71	3.8±1.98	58.69	4.75±1.95	66.36	5.83±2.6	63.15	4.97±1.16	55.52	4.13±1.17
No	44.04	3.43±3.18	41.98	3.64±2.78	35.26	3.07±1.52	37.34	3.83±1.44	45.28	4±2.19
	Z=-2.199, P=0.028		Z=-2.913, P=0.004		Z=-5.667, p<0.001		Z=-4.612, p<0.001		Z=-1.769, p=0.077	
Chronic disease										
Yes	59.8	4.21±2.4	60.88	4.98±2.08	63.03	5.53±2.69	64.1	5.02±1.74	59.3	4.41±1.46
No	40.43	2.99±2.74	39.26	3.37±2.54	38.93	3.4±1.85	35.77	3.75±1.37	40.97	3.7±1.95
	Z=-3.361, p=0.001		Z=-3.767, p=0.004		Z=-4.390, p<0.001		Z=-5.258, p<0.001		Z=-3.163, p=0.002	
Regular use of insulin										
Yes	82.89	6.60±2.22	82.48	6.93±1.46	53.4	4.66±2.58	66.39	5.21±1.37	80.11	5.85±1.53
No	35.26	2.22±1.3	35.45	2.93±1.63	44.33	3.92±2.33	43.02	4.04±1.29	36.57	3.23±1.06
	Z=-7.716, p<0.001		Z=-7.654, p<0.001		Z=-1.544, p=0.123		Z=-3.896, p<0.001		Z=-7.015, p<0.001	
	ITAS									
	Positive		Negative		Total					
	Median	X̄±Ss	Median	X̄±Ss	Median	X̄±Ss				
Education level										
Primary school	57.72	13.43±3.65	43.29	44.21±12.94	47.6	57.64±15.92				
High school	43.67	11.72±3.65	55.4	50.72±11.43	52.4	62.44±14.52				
University	45	11.94±0.97	60.06	53.76±6.56	54.5	65.71±7.24				
	x ² =5.619, p=0.06		x ² =5.797, p=0.055		x ² =0.95, p=0.622					
Marital status										
Married	51.51	12.69±3.95	43.83	45.19±12.83	46.28	57.89±15.96				
Single	47.89	12.21±1.37	67.66	55.86±4.27	61.34	68.07±5.05				
	Z=-0.565, p=.572		Z=-3.695, p<0.001		Z=-2.332, p=0.02					
Complication										
Yes	66.82	14.53±3.02	50.29	47.31±12.27	55.63	61.84±14.87				
No	33.51	10.51±2.51	50.71	49.08±11.96	45.16	59.59±14.2				
	Z=-5.79, p<0.001		Z=-0.073, p=0.942		Z=-1.804, p=0.071					
Chronic disease										
Yes	60.74	13.81±3.69	47.47	45.92±12.96	51.8	59.73±16.09				
No	39.41	11.21±2.53	53.78	50.63±10.67	49.09	61.83±12.67				
	Z=-3.706, p<0.001		Z=-1.088, p=0.276		Z=-0.466, p=0.641					
Regular use of insulin										
Yes	30.22	9.88±2.93	16.5	31.69±3.86	16.5	41.56±5.98				
No	60.04	13.82±2.89	66.5	55.94±4.25	66.5	69.76±6.04				
	Z=-4.838, p<0.001		Z=-8.052, p<0.001		Z=-8.046, p<0.001					

Note. DSMQ= Diabetes Self-Management Questionnaire, GM=Glucose Management, DC=Dietary Control, PA=Physical Activity and HU=Healthcare Use, ITAS=Insulin Treatment Appraisal Scale., M=Mean, SD=standard deviation, Z=Mann-Whitney U Testi, x²= Kruskal-Wallis

The relationship between patients' DSMQ sub-dimensions and ITAS positive and negative item sub-dimensions was evaluated with Spearman's Correlation Analysis. A weak positive significant relationship was found between the GM, DC, FA sub-dimensions and the ITAS positive item sub-dimension ($p < 0.005$). A strong negative significant correlation was found between the GM, DC sub-dimension and the ITAS positive item sub-dimension ($p < 0.005$) (Table 4).

Table 4. Correlation between DSMQ and ITAS

DSMQ	ITAS			
	Positive		Negative	
	r	p	r	p
GM	0.394**	$p < 0.001$	-0.709**	$p < 0.001$
DC	0.322**	.001	-0.723**	$p < 0.001$
FA	0.29**	.003	-0.17	.866
HU	0.051	.616	-0.23	.021

Note. DSMQ= Diabetes Self-Management Questionnaire, GM=Glucose Management, DC=Dietary Control, PA=Physical Activity and HU=Healthcare Use, ITAS=Insulin Treatment Appraisal Scale, ** Correlation is significant at the 0.01 level

DISCUSSION

Type 2 Diabetes Mellitus, one of the most common types of diabetes in society, usually occurs after the age of 40 and its incidence increases with aging. The disease is reported to be more common among women in developing countries while there is no difference in the rate of incidence in terms of gender in developed countries.^[2,24] In this study, the mean age of the patients was 44.57 ± 14.8 and 52% of them were women. National and international studies in the field report the mean age of the patients as over 50 with varying ratios for men and women.^[5,8,20,21,23,25-28] In this study, the mean age was found to be somewhat younger compared to the literature. T2DM is more prevalent when accompanied by obesity. Prevalence of diabetes in obese people is at least twice as high compared to non-obese people.^[24,28] The patients in this study were in the normal weight category with an average BMI of 23. Previous studies demonstrated that diabetic patients are generally in the category of slightly overweight and obese.^[5,17,20,22,26] The mean BMI may be lower in this study compared to other studies in the literature due to the young age of the patients.

Diabetes management is based on the patient's self-assessment of diabetes care outcomes. Diabetes management includes nutritional therapy, regular exercise, blood glucose control, medication and education management and compliance with these parameters.^[3,17,24] In this study, patients' mean DSMQ score was found to be 4.07 ± 1.74 . Accordingly, these patients' diabetes self-efficacy was below the average. Diabetes self-management was found to be below the intermediate level. When the literature is reviewed, it is seen that there are studies supporting our study results.^[26,29] Another important point in diabetes management is the compliance of the patients with the treatment plan that includes diet, exercise and medical applications.^[30,31] In this study, patients' self-management in regards to glucose management, diet control, physical

activity and the use of health services was also found to be low. Previous studies in the field determined that 50%, 71.7%, and 37% of the patients complied with their treatment.^[30,32] Other national studies reported that patients had a low rate of exercise, did not pay attention to their diet, had a low rate of visiting the doctor and had high rates of experiencing hyperglycemia or hypoglycemia.^[25,31]

In type 2 diabetes, insulin treatment starts in cases where acute and chronic complications occur, glycemic control is impaired due to various reasons, and glycosuria accompanies hyperglycemia.^[33] Insulin treatment is initiated in approximately half of the patients with type 2 diabetes in approximately 5 years after the diagnosis.^[8] In this study, the mean duration of insulin use was found to be approximately 3 years. In Holmes et al.^[26] and Snoek et al.^[22], the mean duration for starting insulin treatment was found to be 4.1 and 5.3 years, respectively. Although it is known that approximately half of the diabetes patients in the world need insulin treatment, it is argued that the patients do not take insulin in sufficient amounts.^[5,9] In this study, patients' positive perception towards insulin treatment was moderate. While there are other studies in literature that identified lower positive perception scores than this study,^[5,8] there are also other studies with similar or higher positive perception scores.^[20,26,27] In addition, as a result of our study, it can be argued that patients' negative perception towards insulin treatment was high. Negative insulin assessment is common among T2DM adults.^[26] It is seen that there are studies in the literature that support our study results. However, unlike our study, Ozden et al (2019) found lower negative perception scores (17.4) towards insulin.^[34]

Self-efficacy is a significant predictor of negative insulin treatment perception in patients with type 2 diabetes.^[8] This study also found a highly significant negative correlation between the GM and DC sub-dimensions of the diabetes self-management scale and negative insulin perception. Accordingly, it is concluded that the negative insulin perception is high in patients with high GM and DC management in diabetes. Similarly, Holmes et al.^[26] and Sürücü and Samancıoğlu^[8] also determined that those with more negative insulin appraisals had a decrease in diabetes self-efficacy.

Acute or long-term complications can be observed in diabetes as a result of uncontrolled blood glucose levels. Half of the patients (51%) in this study reported having a chronic complication. In other studies, it is seen that the rates of complications related to diabetes are similar.^[5,8,17,26] Preventing possible diabetes complications is crucial to reduce the burden on the people and the community.^[1,3] Hence, individuals with diabetes need to acquire self-management skills.^[24] In our study, it was determined that patients with complications had better self-efficacy and positive perception towards insulin. It is known that the incidence of complications is high in people with poor diabetes self-management and insulin

perception.^[17,26,29] However, this result of our study shows that individuals with complications may have gained more self-efficacy and created a better perception for the management of complications. Unlike our study, in the study of Yanık and Erol,^[29] no statistical significance was found between the presence of chronic complications and the level of self-efficacy for diabetes. In our study, it was also found that those with different chronic diseases have better self-management and perception of insulin. A chronic disease other than diabetes increases the risk of complications.^[24] These individuals may have gained better self-management to reduce the risk of complications.

As the level of education raises awareness, patients focus more on the symptoms of their illness. In addition, their belief that they can cope with their diseases with appropriate treatment and disease control is increasing.^[35] Therefore, patients with a higher education level can be expected to have a higher self-efficacy. In the literature, there are studies reporting that diabetes self-efficacy increases as the education level of individuals increases.^[29,36] The finding in our study, unlike the literature, is that patients with higher education levels have lower diabetes self-efficacy. This finding shows that, contrary to expectations, people's belief that they can manage their illness well is not related to education level. In addition, it is thought that some sociodemographic and clinical characteristics such as diabetes duration and education about diabetes also affect this relationship.

The primary helpers of people with diabetes in diabetes management are their families and relatives.^[39,40] In our study, it was found that married patients have higher self-management and lower negative perception towards insulin. This finding shows the importance of family support on diabetes management and insulin perception, which is also mentioned in the literature.^[38,39] However, unlike our study, Sürücü and Samancıoğlu (2018) determined that living alone reduces negative perception towards insulin therapy.^[8] Also, there are studies reporting that marital status is not effective in terms of diabetes management and insulin perception.^[25,26,29,36]

It has been reported that patients who use insulin regularly have high positive perceptions of insulin treatment and have low negative perceptions as well as high levels of diabetes self-management. Effective diabetes management requires behavioral adaptation. Individuals' level of compliance to treatment and their attitudes towards diabetes are two factors that affect each other positively.^[36] This study determined that patients using insulin regularly, that is, adapting to insulin treatment, increased their positive evaluation of insulin, decreased their negative evaluation and that attitude positively affected their self-care. Therefore, awareness should be raised about the regular use of insulin in individuals with diabetes through education, etc., and patients should be encouraged to use insulin regularly.

CONCLUSION

Our study results show that patients' diabetes self-management or perception of insulin is low. Nurses can contribute to the participation of patients using insulin in diabetes management and to create a positive insulin perception. For this, it can be suggested that the continuity of patient and nurse interaction and that nurses use their trainer and consultancy roles effectively. In addition, our study revealed that patients with diabetes-related complications and another chronic disease have poor self-management and insulin perception. Therefore, planned and regular training on disease management is needed especially for these patient groups. It may be suggested that the education be continued with home visits after discharge. It is recommended to conduct long-term follow-up studies with larger samples in order to determine the effect of planned training on self-management. In addition, it is recommended to replicate the study in diabetic individuals receiving treatment in services and outpatient clinics. Also, different studies can be conducted with samples comprised of Type 1 diabetes patients.

ETHICAL DECLARATIONS

Ethics Committee Approval: This study was approved by Izmir Bakircay University Non-interventional Clinical Research Ethics committee (Date: 12/10/2020, Decision No: 90/72).

Informed Consent: All patients signed the free and informed consent form.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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