Evaluation of Self-Care in Patients with Diabetic Retinopathy

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ABSTRACT

Aim: This descriptive study aimed to evaluate self-care in patients with diabetic retinopathy.

Material and Methods: The study was conducted with 151 individuals who were diagnosed with diabetic retinopathy in an ophthalmology clinic of a city hospital, met the specified criteria and admitted to participate in the research. A questionnaire form and Diabetes Self-Care Scale (DSCS) were used to collect data.

Results: In this study, the mean DSCS score of patients with diabetic retinopathy was found as 94.2±23.7. There is a weak negative correlation between the DSCS score and fasting and postprandial plasma glucose ($p<0.05$). There is no relationship between the other metabolic parameters examined in the study and the DSCS score ($p>0.05$).

Conclusion: In this study self-care scores of patients with diabetic retinopathy were observed to be acceptable and high level. A weak negative correlation was determined between DSCS scores and fasting and postprandial blood glucose. It is recommended to evaluate patients with diabetic retinopathy in a holistic manner, determine their self-care levels, and make plans and practices to improve their self-care.

Keywords: Diabetes, Diabetic retinopathy, Nursing, Self-care

Diyabetik Retinopatisi Olan Hastalarda Özbakımın Değerlendirilmesi

ÖZ

Amaç: Tanımlayıcı olarak yapılan bu araştırmada diyabetik retinopatisi olan hastalarda öz bakımın incelenmesi amaçlanmıştır.

Gereç ve Yöntemler: Bu araştırma, bir Şehir Hastanesinin Göz Hastalıkları Retina polikliniklerine başvuran, dahil edilme kriterlerini karşılayan ve araştırmaya katılmaya gönüllü olan 151 diyabetik retinopatisi olan hasta ile yapılmıştır. Verilerin toplanmasında anket formu ve Diyabet Özbakım Ölçeği (DÖBÖ) kullanılmıştır.

Bulgular: Bu araştırmada diyabetik retinopatisi olan hastaların DÖBÖ puan ortalaması 94.2±23.7 olarak bulunmuştur. DÖBÖ puanı ile açlık plazma glukozu ve tokluk plazma glukozu arasında zayıf düzeyde negatif korelasyon vardır ($p<0.05$). Araştırmada incelenen diğer metabolik parametreler ile DÖBÖ puanı arasındaki ilişki yoktur ($p>0.05$).

Sonuç: Çalışmada diyabetik retinopatisi olan hastaların öz bakım puanları kabul edilebilir ve yüksek olarak bulunmuştur. DÖBÖ skorları ile açlık ve tokluk kan şekeri arasında zayıf bir negatif korelasyon saptanmıştır. Diyabetik retinopatisi olan hastaların bütüncül bir şekilde değerlendirerek özbakım düzeylerinin belirlenmesi ve özbakımlarını geliştirecek planlamaların ve uygulamaların yapılması önerilir.

Anahtar Sözcükler: Diyabet, Diyabetik retinopati, Hemşirelik, Öz bakım

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INTRODUCTION

Diabetes complications, which can develop acutely or chronically, increase the severity and burden of diabetes by causing damage to many organs at the microvascular and macrovascular levels (1). One of these complications is diabetic retinopathy (DR), which is a chronic microvascular complication (2,3). DR is a progressive neurovascular disease that develops due to systemic disease and causes both structural and functional changes in the retina (4). It is estimated that 103.12 million people worldwide have DR in 2020 and this figure is expected to increase to 160.50 million by 2045 (5). In a study conducted with individuals aged 40 and over in Turkey in 2020, the prevalence of DR was 21% in individuals with diabetes and 2% in the general population (6).

Diabetic retinopathy is one of the conditions that causes vision loss in individuals (7). Retinopathy ranks first among the causes of blindness between the ages of 20-74 in developed countries (8). DR affects the lives of individuals negatively in many ways, and it has been shown in studies that the quality of life of patients with severe DR decreases and their physical, mental and social lives are affected (9-11). Fenwick et al. reported that individuals experience many problems in their daily lives, such as social life, social relations, fulfilling responsibilities, driving, and transportation due to vision loss in diabetic retinopathy (9). A systematic review on the subject reported that the impact on visual functions in diabetic retinopathy increases with disease severity, and the limitations experienced may affect psychological well-being (10). In the study of Mazhar et al., it was stated that emotional effects such as anxiety, uncertainty, and frustration associated with the progression of vision loss were observed in patients with DR and quality of life decreased as vision loss progressed (11). At this point, it is important to prevent the formation and progression of DR, which is frequently seen in individuals with diabetes, can cause visual impairment and blindness, and negatively affects psychosocial well-being and quality of life (12).

This is only possible with effective diabetes management and metabolic control. In the study by ACCORD (Action to Control Cardiovascular Risk in Diabetes Follow-On), it was reported that glycemic control reduced the progression of DR (13). Moreover, in the study of Semeraro et al., it was indicated that low metabolic control affects the risk of DR development. One of the most important concepts for metabolic control in diabetes is self-care (14). Self-care is when individuals fulfill their responsibilities to protect their individual lives, health and well-being. The aim of self-care is to provide that the individual takes all the responsibilities

for his/her own health (15). Activities such as following a diet plan, exercise, self-assessment of blood glucose levels, and compliance with medication treatment are among the basic self-care behaviors of individuals with diabetes. These self-care behaviors are important in reducing complications in individuals with diabetes (15, 16). As a matter of fact, in a study conducted on individuals with type 2 diabetes, it was reported that patients with low diabetes self-management have a high risk of DR (17). At this point, nurses, who have a vital role in health care, have many responsibilities such as training, monitoring and supporting the patients in diabetes self-care (15). It is thought that it is important for nurses to inform diabetic patients about complications that may develop due to diabetes and to emphasize the importance of self-care activities in preventing complications such as DR.

Patients with DR who are trying to cope with a serious complication constitute a risky group for maintaining and developing self-care behaviors due to the effects of vision loss. Evaluating the self-care levels of patients with DR is important in terms of contributing to holistic nursing care in the light of evidence-based information and creating data for future plans to increase self-care in these patients.

MATERIAL and METHODS

Research Design

This descriptive type of research was conducted to evaluate the self-care of patients with retinopathy.

Sample

The population of the study consists of all DR patients who applied to the ophthalmology (Retina) outpatient clinic of Kayseri City Hospital between October 2020 and February 2021. For determination of the sample size, expert opinion was taken from the Department of Biostatistics and in accordance with the literature, 95% confidence (1-α), 95.3% test power (1-β) and an effect size of 0.21, while the number of samples to be taken was determined to be a minimum of 140 people (6). The study was completed with 151 patients with DR.

Participant

Since it is thought that it may affect the results of the study, patients who were within the following inclusion criteria were included in the study, in line with the literature (6,17-21). Patients who volunteered to participate in the study, had been diagnosed with DR at least 6 months ago, were 18 years of age or older, had the cognitive ability to answer the survey questions, and did not have any psychiatric diagnosis were included in the sample group.

Data Collection

A questionnaire form and DSCS were used to collect data.

Questionnaire Form: This form was prepared by the researchers using the literature to determine some socio-demographic and DR-related clinical features of the patients (6,17-21). Furthermore, the form included patients' body mass index (kg/m^2), fasting and postprandial blood glucose, HbA1c (%), lipid profile, and blood pressure (mmHg).

The Diabetes Self-Care Scale: DSCS is a self-report scale that assesses the self-care activities of individuals with type 2 diabetes and (22) it was developed by Lee and Fisher in 2005. The Turkish validity and reliability study of the scale was conducted by Karakurt and Kaşıkçı (23). The DSCS is a 4-point Likert-type scale consisting of 35 items, with the options "Never (1)" "Sometimes (2)" "Often (3)" and "Always (4)". The self-care of the patients who scored more than 66% on the scale was considered to be at an acceptable level. According to the 4-point Likert type, the minimum acceptable level of the scale was determined as 92 points. For this scale the maximum score of the scale is 140, and as the score increases, the patients' ability to perform self-care activities also increases. The Cronbach's alpha value of the scale was 0.81 in the study of Karakurt and Kaşıkçı (23), while it was 0.93 in the present study.

Application of Data Collection Forms

The research was conducted between October 2020 and February 2021. In the retina outpatient clinic where the study was conducted, DR is diagnosed by an ophthalmologist through a fundus examination in which the back of the eye is evaluated with an optical biometry device. OCT (optical coherence tomography) (Germany production) and FFA (fundus fluorescein angiography) (Germany production) are performed to determine the degree of retinopathy and its effect on vessels and nerves, and treatment is planned by the physician according to OCT and FFA evaluations. Data on retinopathy derivative, maculopathy and vitreous hemorrhage were recorded by asking the specialist at the relevant retina clinic.

Patients who had been diagnosed with DR at a retinal outpatient clinic at least six months prior to the study were explained the purpose of the study and invited to participate (Table 1). A questionnaire Form, and DSCS were used in the study through face-to-face interviews with the patients. The questionnaire response time took an average of 15-20 minutes. The interviews were conducted in a quiet and calm environment, hence, the questions could be answered in a more understandable way.

Body mass indexes of the patients were calculated by using weight in kilograms (kg) divided by the square of height in meters (m^2). (BMI = kg/m^2). The fasting and postprandial blood glucose values (second-hour after starting to eat) of the patients were measured by the patients, and the results were recorded by learning over the phone. HbA1c (%), fasting blood glucose, lipid profile were determined in the hospital laboratory on the day of examination by taking blood on an empty stomach. The blood pressure measurements of the patients were made by the researcher using a standard mercury sphygmomanometer while the patient was sitting and in a comfortable position.

Ethical Dimension of the Research

Approval (2020.21.329) was received for this study from the Non-Interventional Clinical Research Ethics Committee of a university and institutional permission was obtained from the city hospital where the research was conducted. Written and verbal consent were obtained from the participants before data were collected. For the use of the scale, permission was requested by contacting Karakurt via e-mail, and the original form of the scale and the information content related to the scoring were also requested and received.

Evaluation of Data

The data were evaluated with IBM SPSS Statistics Standard Concurrent User V 26 statistical package program (IBM Corp., Armonk, New York, USA). Summary statistics of the variables were given as the number of units (*n*), percentage (%), mean±standard deviation ($\bar{x}\pm ss$), median (*M*), minimum value (*min*), maximum value (*max*), first quartile

Table 1: Classification of DR (24).

Mild non-proliferative DR	Microaneurysms only
Moderate non-proliferative DR	Microaneurysms and other signs but not severe non-proliferative DR
Severe non-proliferative DR	Intraretinal hemorrhages (≥20 in each of 4 quadrants), definite venous beading (in at least 2 quadrants), or apparent intra-retinal microvascular abnormality (in at least 1 quadrant), but not proliferative DR
Proliferative DR	Neovascularization of optic disc or elsewhere, preretinal hemorrhage, or vitreous hemorrhage
Diabetic macular edema	Retinal thickening in the macula

(Q_1) and third quartile (Q_3). The normal distribution of the data of numerical variables was evaluated by the Shapiro Wilk normality test and Q-Q graphs. Internal consistency for the DSCS was evaluated with Cronbach's alpha coefficient. Mann Whitney U test was used to compare scale scores with variables with two categories, and the Kruskal-Wallis test was used to compare variables with more than two categories. In case of difference between groups as a result of the Kruskal-Wallis test, the Dunn-Bonferroni was used as a multiple comparison test. The relationship of metabolic variables with scale scores was evaluated with Spearman correlation analysis. A value of $p<0.05$ was considered statistically significant.

RESULTS

A comparison of DSCS scores according to socio-demographical characteristics of patients with DR is given in Table 2. Among the DR patients, 91 (60.3%) of them were female, 66 (43.7%) were between the ages of 60-69, 82 (54.3%) were primary school graduates, and 81 (53.6%) of

them were housewives. There were 139 (92.1%) patients with social security, and 116 (76.8%) patients with a medium-income level. The mean score of DSCS was 94.20±23.70, and the mean age was 60.54±10.06. In the present study, the median self-care scores of men, those aged 39 years and younger, university graduates, and those who cannot work were higher than the other groups ($p<0.05$).

Table 3 includes the comparison of DSCS scores according to the diabetes education status of DR patients. The number of patients who received training diagnosed with DR was 115 (76.2%). Among the 115 patients who received training, 58 (50.4%) of them reported that they received training from nurses and 46 (40.0%) from doctors. Patients in the study, 146 (96.7%) of them answered the duration of their last training as "one year or more". The number of patients who received training on insulin administration sites was 124 (82.1%), who received injection skills training was 116 (76.8%), who received insulin retention training was 111 (73.5%), who received nutrition training 105 (69.5%),

Table 2: Comparison of DSCS Scores According to Socio-Demographical Characteristics of Patients with DR

Socio-Demographical Characteristics		Diabetes Self-Care Scale Scores			Test Stat.	
	n (%)	M	Q1	Q3	Test Value	p value
Gender						
Female	91 (60.3)	90.0	70.0	103.0	3.670[†]	**<0.001**
Male	60 (39.7)	102.5	87.0	130.0		
Age					15.158[¥]	**0.004**
39 years and below	4 (2.6)	118.5[a]	97.5	132.0		
40-49	19 (12.6)	101.0[a]	68.0	131.0		
50-59	37 (24.5)	97.0[a]	80.5	115.0		
60-69	66 (43.7)	97.5[a]	87.0	105.5		
70 years and above	25 (16.6)	70.0[b]	58.5	97.0		
DSCS $\bar{x} \pm sd$	94.20±23.70					
Age (year) $\bar{x} \pm sd$	60.54±10.06					
Educational status						
Literate/ illiterate	50 (33.1)	81.5[a]	62.0	99.0		
Primary school	82 (54.3)	97.0[b]	81.5	110.5	37.851[¥]	**<0.001**
Secondary school	12 (7.9)	126.0[bc]	92.8	130.0		
University	7 (4.6)	135.0[c]	131.0	137.0		
Profession						
Housewife	81 (53.6)	90.0[a]	70,0	103,0		
Officer	2 (1.3)	-	-	-	10.111[¥]	**0.018**
Retired	54 (35.8)	98.0[b]	85.3	122.3		
Employee	8 (5.3)	109.0[b]	83.0	130.8		
Unemployed	6 (4.0)	124.5[b]	70.8	134.5		
Income Status						
Bad	20 (13.2)	88.0	70.0	112.3		
Moderate	116 (76.8)	95.5	78.0	107.3	4.159[¥]	0.125
Good	15 (9.9)	128.0	77.0	135.0		

*M: Median, **Q1**: First quarter value, **Q3**: Third quarter value, [†]: Mann-Whitney U Test, [¥]: Kruskal-Wallis one-way analysis of variance, Superscripts [a], [b], and [c] indicate differences between groups. Groups with the same letter are statistically similar.*

Table 3: Comparison of DSCS Scores According to Diabetes Training Status of Patients with DR

Diabetes Training Status		Diabetes Self-Care Scale Scores			Test Stat.	
	n (%)	M	Q1	Q3	Test Value	p Value
To have received training on disease status						
Yes	115 (76.2)	98.0	87.0	115.0	3.776[†]	**<0.001**
No	36 (23.8)	78.0	63.0	95.0		
To have received training on nutrition in diabetes						
Yes	105 (69.5)	98.0	78.0	114.5	1.355[†]	**0.018**
No	46 (30.5)	88.0	71.5	103.2		
To have received training on complications of diabetes						
Yes	31 (20.5)	107.0	77.0	130.0	2.387[†]	**0.017**
No	120 (79.5)	91.5	75.7	104.0		
To have received training on exercise						
Yes	30 (19.9)	102.0	84.0	130.0	2.055[†]	**0.040**
No	121 (80.1)	94.0	75.0	106.0		
DM diagnosis duration (year)						
0-5 years	9 (6.0)	87.0	59.5	114.5		
6-10 years	31 (20.5)	89.0	77.0	112.0	2.059[¥]	0.560
11-15 years	69 (45.7)	95.0	78.0	104.5		
16 years and above	42 (27.8)	100.0	78.5	114.8		
Diabetes Control Frequency						
When uncomfortable	18 (11.9)	85.0	66.5	102.5		
Once a month	10 (6.6)	96.5	80.3	118.0		
Once every two months	4 (2.6)	92.5	66.8	101.8	5.361[¥]	0.373
Once every three months	73 (48.3)	95.0	77.5	113.0		
Once every six months	20 (13.2)	91.5	69.3	118.8		
Once a year	26 (17.2)	99.0	89.0	109.5		

M: Median, **Q1:** First quarter value, **Q3:** Third quarter value, [†]: Mann-Whitney U Test, [¥]: Kruskal-Wallis one-way analysis of variance, Superscripts [a], [b], and [c] indicate differences between groups. Groups with the same letter are statistically similar.

who received complication training was 31 (20.5%), and who received exercise training was 30 (19.9%). The number of patients with diabetes diagnosis of 11-15 years was 69 (45.7%). There were 90 (59.6%) patients using oral antidiabetic, 136 (90.1%) using insulin and 100 (66.2%) patients using other drugs. The number of patients whose other disease was hypertension was 89 (58.9%). Moreover, 73 of the patients (48.3%) go to diabetes control every three months. The median self-care scores of those who received nutrition, complication and exercise training when diagnosed with DR were statistically and significantly higher than those who did not receive training.

According to Table 4, the number of patients with DR diagnosed between one and five years was 78 (51.7%), the number of patients going for monthly eye control was 100 (66.2%), the number of patients with DR stage PDR was 54 (35.8%), the number of patients with diabetic maculopathy was 101 (66.9%) and the number of patients with vitreous hemorrhage was 23 (15.2%). Furthermore, the mean DSCS scores of those with a DR duration of 1-5 years and those who go to eye check-ups every three months were statistically higher.

Descriptive statistics of metabolic control variables of patients with DR are given in Table 5. The mean BMI (Body Mass Index) (kg/m^2) of patients with DR was 31.3±6.6, fasting blood glucose was 175.2±73.8, postprandial blood glucose was 268.8±87.8, HbA1c (%) was 8.8±1.8, HDL (mg/dl) was 45.4±12.4, LDL (mg/dl) was 116.4±41.6, total cholesterol (mg/dl) was 195±47.4, triglyceride (mg/dl) was 197.2±116.5, systolic blood pressure (mmHg) was 135.8±19.1, and diastolic blood pressure (mmHg) was 80.3±9.2.

According to Table 6, there was a weak negative correlation between DSCS scores and fasting blood glucose and postprandial blood glucose (*rho*=-0.177; *p*<0.05 & *rho*=-0.209; *p*<0.05). The correlation coefficients between other metabolic variables and DSCS scores were not statistically significant (*p*>0.05).

DISCUSSION

Due to DR, which is one of the microvascular complications of diabetes, individuals may experience different degrees of visual loss, and their lives may be limited in terms of bio-psycho-social aspects. All these restrictions may affect the

Table 4: Comparison of DSCS Scores According to DR-Related Characteristics of Patients with DR

DR-Related Characteristics		Diabetes Self-Care Scale Scores			Test Stat.	
	n (%)	M	Q1	Q3	Test Value	p Value
DR diagnosis duration (year)						
Less than 1 year	28 (18.5)	87.0^a	63.3	101.8	6.205$^¥$	**0.045**
1-5 years	78 (51.7)	99.0^b	78.0	114.5		
6 years and above	45 (29.8)	95.0^{ab}	77.0	107.5		
Eye Check Frequency						
Once a month	100 (66.2)	90.0^a	72.8	104.0		
Quarterly	36 (23.8)	106.5^b	92.0	130.0	10.237$^¥$	**0.017**
Once in a six month	11 (2.6)	88.0^a	63.0	119.0		
One year and above	4 (7.3)	86.5^a	77.0	106.5		
DR Stage						
*Mild NPDR	32 (21.2)	95.0	72.8	106.5		
*Moderate NPDR	37 (24.5)	103.0	83.5	122.5	4.277	0.233
*Severe NPDR	28 (18.5)	96.5	79.5	117.0		
**PDR	54 (35.8)	93.0	70.0	101.3		

M: Median, **Q1:** First quarter value, **Q3:** Third quarter value, **¥**: Kruskal-Wallis one-way analysis of variance, Superscripts ^{a}, ^{b}, and ^{c} indicate differences between groups. Groups with the same letter are statistically similar. *NPDR: Non-proliferative DR,** PDR: Proliferative DR

Table 5: Descriptive Statistics of Metabolic Control Variables of Patients with DR

Metabolic Control Variables	$\bar{x} \pm sd$	M	min-max
BMI (kg/m²)	31.3±6.6	30.1	20.37-76.92
Fasting blood glucose	175.2±73.8	158.0	59-422
Postprandial blood glucose	268.8±87.8	250.0	125-591
HbA1c (%)	8.8±1.8	8.6	5.4-13.9
HDL (mg/dl)	45.4±12.4	44.0	21-93
LDL (mg/dl)	116.4±41.6	111.0	35-308
Total cholesterol (mg/dl)	195±47.4	188.0	104-321
Triglyceride (mg/dl)	197.2±116.5	168.0	46-771
Systolic blood pressure (mmHg)	135.8±19.1	140.0	90-180
Diastolic blood pressure (mmHg)	80.3±9.2	80.0	60-110

$\bar{x}$±sd: mean±standard deviation, **M:** Median, **min:** minimum value, **max:** maximum value.

Table 6: The Relationship Between Patients' DSCS Scores and Metabolic Control Variables

Metabolic Control Variables	DSCS Scores	
	rho	p
BMI (kg/m²)	-0.088	0.284
Fasting blood glucose	**-0.177**	**0.030**
Postprandial blood glucose	**-0.209**	**0.010**
HbA1c (%)	-0.098	0.233
HDL (mg/dl)	-0.025	0.761
LDL (mg/dl)	-0.046	0.575
Total cholesterol (mg/dl)	-0.067	0.413
Triglyceride (mg/dl)	0.015	0.853
Systolic blood pressure (mmHg)	0.159	0.051
Diastolic blood pressure (mmHg)	0.020	0.812

rho: Spearman correlation coefficient.

self-care level of patients with DR. This descriptive study was conducted with 151 patients with DR to evaluate self-care in patients with DR, and the findings of the study were discussed in light of the literature.

In this study, the DSCS score of patients with DR was determined to be 94.20±23.70. Considering that the lowest score that can be obtained from DSCS was 44 and the highest score was 137, it can be stated that the self-care scores of the patients with DR were observed to be at an acceptable level and high. In studies conducted with individuals with type II DM in the literature, similar to the results of our study, the DSCS score was 93.85±12.02 in the study of İlhan et al. and 92.79±10.50 in the study of Karakurt and Kaşıkçı (23, 25). In a study on DR individuals, it was stated that 62.7% of the patients with DR had an acceptable level of general self-care activities (21).

In the present study, the DSCS score was determined to be the lowest in the group with PDR, which is the most sight-threatening stage of DR, compared to other stages. This shows that as the severity of retinopathy increases, the self-care levels of the patients decrease. Studies on the subject have also reported that as the severity of diabetic retinopathy increases, physical limitations increase, and psychological well-being is negatively affected (10,11). Healthcare staff need to be aware of the DR stage and the limitations it may impose on the patient. Moreover, nurses should constantly evaluate the self-care of patients, and provide training to increase self-care and increase their motivation.

In this study, the DSCS scores of male patients were higher than female patients and it was determined that more than half of the participants were housewives and the DSCS scores of housewives were the lowest compared to other occupational groups. This situation may have caused women to spend too much time on housework and thus not fulfill their self-care activities sufficiently. In many studies, no significant difference was determined between gender and self-care power (26-28).

It was determined that the self-care of patients with DR decreased with increasing age groups and DSCS scores of patients aged 70 years and older were statistically lower compared to other age groups. There are studies in the literature stating that self-care decreases with aging (25,29). It is thought that the decrease in self-care of patients with aging may be related to reasons such as the decrease in functional capacity, increase in chronic diseases, increase in diseases-related complications and decrease in physical activity. It is thought that all these changes seen with aging will affect the motivation of the individual with diabetes to maintain self-care. Thus, self-care behaviors such as exercise, adherence to a diet plan, regular health checks, and self-monitoring of blood glucose may be negatively affected.

Increasing the level of education in individuals with diabetes is an important factor that increases the level of self-care (27,29). In our study, in accordance with the literature, it was determined that DSCS scores increased as the level of education increased. The DSCS score of the illiterate group was the lowest, and the score of university graduates was significantly higher. It is thought that with the increase in the education level, the health awareness of individuals, their knowledge and skills about the disease and its management increase, and this situation has a positive effect on the development of self-care behaviors. As the education level of diabetic patients increases, their awareness of the complications of diabetes will increase, and this will affect self-care behaviors.

In the present study, it was found that income level did not affect DR self-care mean scores. Similar to our study findings, in previous studies on the subject, it was observed that there was no significant difference between income level and self-care (25,27,28).

According to our study, it was determined that those who received training about the disease had higher scores when diagnosed with DR. The DSCS scores of those who received training about nutrition, exercise and diabetes-related complications were statistically and significantly higher than those who did not receive training. Many studies on patient education and follow-up in diabetes emphasize the importance of education in the management of diabetes (19,30). It is thought that regular follow-up, education and repetition of training at regular intervals will enable patients with diabetes to remember the information they have forgotten and will positively affect self-care and behavioral changes in diabetes. Besides, regular training about diabetes and self-care can provide them with information about new and evidence-based practices in care and increase their self-care motivation.

The DSCS scores of the patients were similar according to the frequency of consulting a physician for diabetes control. Similar to our study, it was determined that the difference between diabetes control frequency and self-care power score was not significant in the study conducted by İstek and Karakurt (27).

It is known that glycemic control is important in preventing DR (31). In the literature, the positive effect of self-care on metabolic control in type 2 diabetes patients was mentioned, and it was reported that the HgA1c level decreased as the self-care level increased (25,32,33). In this study, it was observed that there was a weak negative correlation between DSCS scores and fasting and postprandial blood glucose. These findings show that increasing the level of self-care in patients with DR is also important in the control of metabolic variables. At this point, healthcare personnel should consider the positive effect of increasing the level of self-care on metabolic parameters in patients with DR. It is thought that informing patients about these positive effects in training to increase self-care will increase their self-care motivation.

CONCLUSION

As a result, the self-care scores of patients with DR were acceptable and high in the present study. Men aged 39 years and younger, those with a university degree, those who received diabetes training when diagnosed with diabetes and those who attended eye check-ups every three months were observed to have higher DSCS scores. A weak negative

correlation was determined between DSCS scores and fasting and postprandial blood glucose. Early detection of DR and control of modifiable risk factors are very important in the control of the disease. Therefore, it is important to evaluate the self-care levels of patients at regular intervals after the diagnosis of diabetes, to determine the factors that negatively affect their self-care activities, and to plan and implement interventions to improve self-care. It is recommended to evaluate the effects of vision problems on the self-care levels of patients with DR and to implement practices to support self-care. It is also important to develop innovative techniques and devices to facilitate self-care activities, such as blood glucose monitoring in patients with diabetic retinopathy.

Limitations of the Research

The sample of this study is limited to patients in a single center. The limitations of the study were that the study was conducted within certain time limits (October 2020-February 2021) and the a decrease in the number of outpatient applications due to the COVID-19 pandemic restrictions.

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