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The Effect of Self-Efficacy Level on Quality of Life in Patients with Type-2 Diabetes

Burak ARSLAN[1], **Afitap ÖZDELİKARA**[2]
[1]Hitit University, İskilip Vocational School, Department of Medical Services and Techniques, Çorum, Turkey
[2]Ondokuz Mayıs University, Faculty of Health Sciences, Department of Nursing, Samsun, Turkey

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ABSTRACT

Aim: This study was conducted to determine the effect of self-efficacy level on quality of life in patients with type-2 diabetes.

Material and Methods: This descriptive type study was conducted with 150 patients with type-2 diabetes who received inpatient treatment in a University Health Practice and Research Center between October 2017 and February 2018. The data were collected using information form, Diabetes Management Self-Efficacy Scale, and Short Form-36 (Short Form-36/SF-36) Quality of Life Questionnaire. Percentage, mean, Kruskal Wallis and Mann Whitney U tests, and Spearman correlation analysis were used to analyze the data.

Results: It was determined in the study that self-efficacy scale total score in diabetes was 54.16±14.65; the highest mean score among the subscales of the quality of life questionnaire belonged to mental health (20.17±4.79). It was determined that there was a positive significant correlation between the self-efficacy total score in diabetes of the patients and the physical functioning, physical role difficulty, general health, energy, social function, emotional role difficulty and mental health subscales of SF-36 quality of life questionnaire ($p<0.05$).

Conclusion: In the study, it was concluded that as self-efficacy levels of patients with type-2 diabetes increased, their quality of life increased in many areas as.

Keywords: *Diabetes mellitus, Nursing, Self efficacy, Quality of Life*

Tip-2 Diyabetli Hastalarda Öz Yeterlilik Düzeyinin Yaşam Kalitesine Etkisi

ÖZ

Amaç: Bu çalışma tip-2 diyabetli hastalarda öz yeterlilik düzeyinin yaşam kalitesine etkisini belirlemek amacıyla yapılmıştır.

Gereç ve Yöntemler: Tanımlayıcı tipte olan çalışma Ekim 2017- Şubat 2018 tarihleri arasında bir üniversitenin Sağlık Uygulama ve Araştırma Merkezi'nde yatarak tedavi gören 150 tip-2 diyabet hastası ile gerçekleştirilmiştir. Veriler tanıtıcı form, Tip-2 Diyabetli Hastalar İçin Diyabet Yönetimindeki Öz Yeterlilik Ölçeği ve Kısa Form-36 (Short Form-36\SF-36) Yaşam Kalitesi Ölçeği kullanılarak toplanmıştır. Verilerin analizinde yüzdelik, ortalama, Kruskal Wallis ve Mann Whitney U testleri, Spearman korelasyon analizi kullanılmıştır.

Bulgular: Araştırmaya katılan hastaların diyabette öz yeterlilik ölçek toplam puanı 54,16±14,65; yaşam kalitesi ölçek alt boyutları arasında ise en yüksek ortalama puan 20,17±4,79 ile mental sağlık olarak belirlenmiştir. Çalışma kapsamındaki hastaların diyabette öz yeterlilik toplam puanı ile SF-36 yaşam kalitesi ölçek alt boyutlarından fiziksel fonksiyon, fiziksel rol güçlüğü, genel sağlık, enerji, sosyal fonksiyon, emosyonel rol güçlüğü, mental sağlık alt boyutları arasında pozitif yönde anlamlı ilişki olduğu belirlenmiştir ($p<0,05$).

Sonuç: Araştırmada tip-2 diyabetli hastaların öz yeterlilik düzeylerinin artması ile yaşam kalitelerinin birçok alanda artış gösterdiği sonucuna varılmıştır.

Anahtar Sözcükler: *Diyabetes mellitus, Hemşirelik, Öz yeterlik, Yaşam kalitesi*

ORCID: Burak Arslan / 0000-0002-4981-2806, Afitap Özdelikara / 0000-0002-5896-9207

Correspondence Address / Yazışma Adresi:
Burak ARSLAN
Hitit University, İskilip Vocational School, Department of Medical Services and Techniques, Çorum, Turkey
Phone: +90 (542) 579 05 27 • E-mail: burakarslanhacettepe221@gmail.com

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INTRODUCTION

According to the data of International Diabetes Federation (IDF) for 2021, the prevalence of diabetes in individuals aged between 20-79 years was reported to be 10.5% in the world. This rate is estimated to increase to 12.2% in 2045 in the world (1). According to the data of World Health Organization (WHO) , diabetes is among the top 10 causes of death and disability in the world. (2). In IDF 2019 diabetes atlas, diabetes incidence in adult population of Turkey was reported to be 12.00% (3). Diabetes is a major public health problem in Turkey and in the world.

An individual who has to live with diabetes has to apply many lifestyle changes into his/her life. The ability to make this transition is closely related to the "self-efficacy" concept (4). Self-efficacy concept was defined by Albert Bandura as a belief of a person to show the expected performance in a subject (5). In a meta-analysis study, it was determined that self-efficacy perception in patients has a positive relationship with coping stress and quality of life (6).

The concept of quality of life is defined by WHO as perception of a person about his/her own life in terms of his/her purposes, interests, expectations and standards within his/her culture and values system (7). Diabetes mellitus, a chronic disease, can bring many negativities such as strict lifestyle changes and chronic complications. Because of all these reasons, diabetes is a disease affecting the quality of life (8).

Study results indicating that self-efficacy level in diabetic patients affects the overall quality of life or quality of life related to health have been reported (9-11). In order to increase self-efficacy levels of diabetic patients and improve their quality of lives, it is important to determine the predictive factors and the relationship between concepts. This study was designed to determine the effect of self-efficacy level on quality of life in patients with type-2 diabetes.

MATERIAL and METHODS

The study was conducted in a descriptive design. The data was collected with 150 patients meeting the inclusion criteria in internal medicine clinics of a University Health Practice and Research Center between October 2017 and February 2018. Data were collected face-to-face with hospitalized patients. It took approximately 15 minutes for the patients to answer the questions. The sample size was determined with power analysis (confidence interval of 95% and power rate of 0.95). Patients who;

- Were over 18 years of age and diagnosed with type-2 diabetes for over 1 year,
- Were willing to participate in the study,
- Had no neurological and psychiatric disabilities that prevent their participation in the study were included in the study.

The data were obtained using information form, Diabetes Management Self-Efficacy Scale, and Short Form-36 (Short Form-36\SF-36) Quality of Life Questionnaire.

Information Form

The Information Form prepared by the researchers in the light of the literature consists of seven questions. Out of these questions, three were about sociodemographic characteristics of the patients and four were about their disease-related characteristics.

Diabetes Management Self-Efficacy Scale

The scale was developed by Jaap van der Bijl et al., in 1999 to measure self-efficacy of individuals with type 2 diabetes. Its validity-reliability study was conducted by Usta in 2001. This scale in 5-point Likert type is composed of 20 questions. While the lowest score to be taken from the scale is 20, the highest score is 100. The scale mean score is calculated in the sample for whom the application was made and the individuals above the average are evaluated to have high self-efficacy and the individuals below the average are evaluated to have low self-efficacy (12). The scale has 4 subscales including specific nutrition and weight, general nutrition and medical treatment control, physical exercise, and blood sugar (12).

In the original study, the Cronbach's alpha value was 0.890 (12). In this study, the Cronbach's alpha value of the scale was found as 0.858 and it was concluded that the scale was valid and reliable for the study. It was concluded that the scale was valid and reliable for the research.

Short Form-36 (SF-36) Quality of Life Questionnaire

The scale was developed by Rand Corporation in 1992 and its Turkish validity-reliability study was conducted by Kocyigit et al., in 1999 (13,14). The scale is composed of 8 subscales and 36 items (14). In the scale, in which each subscale allows to be rated between 0-100, score close to 0 refers to low quality of life perception on that subscale and scores close to 100 show high quality of life perception (15). In the original study, the Cronbach's alpha coefficients of the sub-dimensions ranged from 0.732 to 0.761. In this study, Crohnbach's alpha values for eight sub-dimensions of the SF-36 quality of life scale were found to be between 0.718 and 0.997, and it was concluded that the scale was valid and reliable for the study.

Before starting the study, approval from University Clinical Trials Ethics Committee (No:B.30.2.ODM.0.20.08\1031)

(APPX.-V) and written permissions from University Health Practice and Research Center where the study would be conducted (No:15374210-757.01-E.16491) were obtained. Informed consents were obtained from the patients who participated in the study. This study was conducted in conformity with the principles of the Declaration of Helsinki.

The data was analyzed using IBM Statistical Package for Social Sciences Version-23. Percentage, mean, Kruskal Wallis and Mann Whitney U tests, and Spearman correlation analysis were used in the data analysis. The fit for the normal distribution was examined by Shapiro Wilk. The non-normally distributed data were presented as median (min-max) and the significance level was taken as $p<0.05$. As a result of the analysis made in the GPower version 3.1 statistical analysis program, it was determined that the sample should consist of a minimum of 118 participants with a 95% confidence interval and a power ratio of 0.95. Due to the possibility that the number of participants may decrease, it was decided that the sample should consist of 150 participants in order to prevent a decrease in the power ratio, and the study was carried out with the participation of 150 patients. The study results are limited with the related sample and cannot be generalized.

Table 1: Distribution of Sociodemographic and Disease-Related Data (n=150)

Sociodemographic Data *	Findings (n=150)
Gender	
Male	57 (38.0)
Female	93 (62.0)
Age	
≤49	13 (8.6)
50-59	25 (16.6)
≥60	112 (74.8)
Education	
Illiterate	49 (32.7)
Primary school	69 (46.0)
Secondary school	11 (7.3)
High school	10 (6.7)
University	11 (7.3)
Status of receiving diabetes training	
Yes	85 (56.7)
No	65 (42.3)
Status of using oral antidiabetic	
Yes	61 (40.7)
No	89 (59.3)
Status of using insulin	
Yes	120 (80.0)
No	30 (20.0)
Presence of diabetes complication (n=150, more than one option was marked.)	
Nephropathy	53 (15.1)
Retinopathy	72 (20.5)
Neuropathy	111 (31.5)
Diabetic foot	16 (4.6)
Coronary artery disease	83 (23.6)
Cerebrovascular disease	2 (0.6)
No complication	15 (4.3)

*Data were shown as n (%).

RESULTS

Table 1 shows the sociodemographic characteristics of the patients who participated in the study. Of the patients included in the study, 62% were female, 74.8% were in the age group of 60 years and over and 32.7% were reported to be illiterate. 56.7% of the patients expressed that they received diabetes training, 40.7% were using oral antidiabetic, 80% were using insulin, and 31.5% experienced neuropathy.

Table 2 shows the distribution of mean scores of diabetes management self-efficacy scale and SF-36 quality of life questionnaire. It was determined that diabetes management self-efficacy scale total mean score of the patients was 54.16±14.65. The highest mean score (24.12±7.46) belonged to the general nutrition and medical treatment control subscale; on the other hand, the lowest mean score (7.23±3.31) belonged to physical exercise subscale. When subscales of SF-36 scale were examined, it was determined that while the

Table 2: Distribution of Mean Scores of Diabetes Management Self-Efficacy Scale and SF-36 Quality of Life Questionnaire

Diabetes Management Self-Efficacy Scale		
Subscales of the study	**Findings (n=150)**	**Range**
Specific nutrition and weight*	13.08±5.37	5-25
Physical exercise*	7.23±3.31	3-14
Blood sugar*	9.73±3.57	3-15
General nutrition and medical treatment control*	24.12±7.46	7-41
Self-Efficacy Scale Total*	54.16±14.65	18-86
SF-36 Quality of Life Questionnaire		
Subscales of the study	**Findings (n=150)**	**Range**
Physical functioning*	16.22±6.90	10-30
Physical role difficulty*	4.79±1.58	4-8
Bodily pain*	5.99±3.03	1-10
General health*	13.60±4.17	5-24
Energy*	11.88±4.51	4-24
Social functioning*	8.43±2.60	2-10
Emotional role difficulty*	4.63±1.49	3-6
Mental health*	20.17±4.79	8-30

*Data were shown as mean ± standard deviation and minimum-maximum values

highest mean score (20.17±4.79) belonged to mental health, the lowest mean score (4.63±1.49) belonged to emotional role difficulty subscale.

Table 3 shows the distribution of scores obtained by the patients from diabetes management self-efficacy scale and its subscales according to their descriptive characteristics.

Table 3. Distribution of Diabetes Management Self-Efficacy Scale and Subscale Scores According to Descriptive Characteristics

	Diabetes Management Self-Efficacy Scale				
Characteristics	**Specific nutrition and weight**	**Physical exercise**	**Blood sugar**	**General nutrition and medical treatment control**	**Self-efficacy Scale Total**
Gender					
Male	14 (5 - 25)	9 (3 - 13)	11 (3 - 15)	24 (9 - 38)	54 (23 - 80)
Female	14 (5 - 23)	6 (3 - 14)	11 (3 - 15)	25 (7 - 41)	56 (18 - 86)
	U= 2638.500	U= 2031.500	U= 2462.000	U= 2214.000	U= 2561.5
	p=0.963	p=**0.016**	p=0.459	p=0.091	p=0.730
Age					
≤49	16 (5 - 20)	10 (7 - 13)[a]	12 (7 - 15)[a]	29 (17 - 39)[a]	64 (51 - 77)[a]
50-59	11 (5 - 25)	9 (3 - 14)[ab]	11 (6 - 15)[ab]	26 (13 - 38)[ab]	57 (34 - 80)[ab]
≥60	14.5 (5 - 23)	6 (3 - 13)[b]	11 (3 - 15)[b]	24 (7 - 41)[b]	54.5 (18 - 86)[b]
	X^2= 0.8	X^2= 16.1	X^2= 13.0	X^2= 8.0	X^2= 11.0
	p=0.665	**p<0.001**	p=**0.002**	p=**0.018**	p=**0.004**
Education					
Illiterate	14 (5 - 20)	5 (3 - 13)[a]	8 (3 - 15)[a]	24 (7 - 38)	51 (18 - 75)
Primary school	14 (5 - 20)	8 (3 - 14)[b]	11 (3 - 15)[b]	25 (10 - 41)	56 (31 - 86)
Secondary school	15 (9 - 20)	10 (3 - 12)[ab]	12 (7 - 15)[b]	25 (16 - 38)	63 (47 - 77)
High school	13 (5 - 23)	8,5 (3 - 12)[ab]	12 (9 - 15)[b]	25 (9 - 36)	60 (33 - 80)
University	16 (5 - 25)	9 (4 - 13)[b]	12 (3 - 15)[b]	23 (17 - 30)	55 (47 - 79)
	X^2= 4.718	X^2= 20.250	X^2= 25.311	X^2= 5.720	X^2= 11.023
	p=0.318	**p<0.001**	**p<0.001**	p=0.221	p=0.050
Status of receiving diabetes training					
Yes	14 (5 - 25)	7 (3 - 13)	12 (3 - 15)	25 (7 - 41)	58 (18 - 86)
No	14 (5 - 21)	6 (3 - 14)	9 (3 - 15)	24 (7 - 38)	53 (18 - 77)
	U= 2697	U= 2442.5	U= 2036.5	U= 2344.5	U= 2237.5
	p=0.800	p=0.200	**p<0.001**	p=0.100	**p=0.046**
Using oral antidiabetic drug					
Yes	13 (5 - 23)	8 (3 - 13)	10 (3 - 15)	29 (12 - 41)	58 (26 - 86)
No	14 (5 - 25)	6 (3 - 14)	11 (3 - 15)	23 (7 - 35)	54 (18 - 80)
	U= 2598.5	U= 2398	U= 2255	U= 1448	U= 2143
	p=0.700	p=0.200	p=0.100	**p<0.001**	**p=0.029**
Using insulin injection					
Yes	14,5 (5 - 25)	6 (3 - 14)	11 (3 - 15)	24 (7 - 39)	56 (18 - 80)
No	13 (5 - 23)	8 (3 - 12)	8 (3 - 14)	27.5 (12 - 41)	53 (26 - 86)
	U= 1778.5	U= 1693	U= 1198.5	U= 1284	U= 1759.5
	p=0.900	p=0.600	**p<0.001**	**p<0.001**	p=0.849
Presence of diabetes complication					
Nephropathy	14 (5 - 25)	6 (3 - 13)	11 (3 - 15)	22 (7 - 38)	51 (18 - 79)
Retinopathy	12 (5 - 20)	8 (3 - 14)	11 (3 - 15)	25 (9 - 39)	56 (27 - 77)
Neuropathy	13 (5 - 23)	6 (3 - 13)	11 (3 - 15)	25 (7 - 39)	56 (18 - 80)
Diabetic foot	11 (5 - 23)	6 (3 - 12)	12 (3 - 14)	22 (7 - 34)	50 (18 - 78)
Coronary artery disease	13 (5 - 25)	6 (3 - 13)	11 (3 - 15)	24 (7 - 38)	55 (18 - 80)
Cerebrovascular disease	11 (6 - 16)	6 (4 - 8)	10.5 (9 - 12)	19.5 (14 - 25)	47 (33 - 61)
No complication	15 (5 - 20)	10 (3 - 13)	12 (3 - 15)	28 (11 - 41)	62 (27 - 86)
	X^2= 2.75	X^2= 10.84	X^2= 4.39	X^2= 11.76	X^2= 8.29
	p= 0.907	p= 0.146	p= 0.733	p= 0.109	p= 0.307

There is a statistically significant difference between different letters (a, b).

When the self-efficacy scale scores were examined in terms of gender variable, it was found that only physical exercise subscale was affected by the gender variable and physical exercise subscale median values of the women were lower than those of the men ($p<0.05$, Table 3).

When the age variable was examined, it was found that the age group of 49 and younger had high median score value from all subscales and the overall scale. The difference between the age variable and physical exercise, blood sugar, general nutrition and medical treatment control and self-efficacy total score was found to be statistically significant ($p<0.05$, Table 3).

It was determined that diabetes management self-efficacy scale total score did not differ according to the education level of the patients ($p>0.05$). Illiterate patients had significantly low median value in physical exercise and blood sugar subscales compared to the other groups ($p<0.05$).

Patients, who reported not to receive diabetes training, were found to have low median value in the overall scale and the subscales other than specific nutrition and weight subscale. A statistically significant difference was determined between the status of receiving diabetes training and general nutrition and medical treatment control subscale and scale total score ($p<0.05$).

The status of using oral antidiabetic drugs affected general nutrition and medical treatment control subscale and self-efficacy total score ($p<0.05$). General nutrition and medical treatment control subscale and self-efficacy total median value of the patients who did not use oral antidiabetic drugs was lower.

When the scale values were examined in terms of the status of using insulin injection, it was determined that blood sugar subscale and general nutrition and medical treatment control subscale were affected by the status of using insulin ($p<0.05$). Median score of blood sugar subscale was high but median score of general nutrition and medical treatment control subscale was low in patients using insulin ($p<0.05$).

When the presence of diabetes complication was compared with diabetes management self-efficacy scale and subscale median scores, it was found that the individuals who had no complication related to diabetes received high scores from all subscales and overall scale and the difference between them was statistically insignificant ($p>0.05$).

Table 4 shows the distribution of SF-36 quality of life questionnaire scores according to sociodemographic data and disease-related data. When the gender variable was examined, it was found that while median values of physical role difficulty and social functioning subscales were equal in both genders, median values of the other subscales were lower in female patients. The variable of gender affected all subscale median values except for energy subscale ($p<0.05$, Table 4).

The variable of age affected only the physical functioning subscale ($p<0.05$). Physical functioning-related quality of life median value of the patients in the age group of 60 and over was lower than the other groups ($p<0.05$).

The difference between the education level and median values of physical functioning, physical role difficulty and mental health subscales was statistically significant ($p<0.05$). The patients who reported to be university graduates had the highest median values; whereas, the patients who reported to be illiterate constituted the group having the lowest median value.

While no statistically significant difference was found between the statuses of receiving diabetes training, using oral antidiabetic drugs, and using insulin and SF-36 subscales, a statistically significant difference was determined between presence of diabetes complication and physical functioning subscale ($p<0.05$). The patients having no complications related to diabetes had significantly high mean score in physical functioning subscale compared to the other groups ($p<0.05$).

Table 5 shows the correlation analysis of the diabetes management self-efficacy scale total score and subscale scores and the subscales of SF-36 quality of life questionnaire of the participants. A positive and moderate significant correlation was found between the diabetes management self-efficacy scale total score and physical functioning subscale score of the participants (rho=0.405). Similarly, there was a positive weak correlation between self-efficacy and physical role difficulty, general health, energy, social functioning, emotional role difficulty and mental health subscales (rho values of 0.208, 0.333, 0.349, 0.233, 0.213 and 0.379, respectively) ($p<0.05$). No statistically significant correlation was found between self-efficacy level and bodily pain subscale.

A positive weak correlation was determined between specific nutrition and weight subscale and physical functioning, physical role difficulty, energy, social functioning and mental health subscales (rho values of 0.182, 0.201, 0.217, 0.262 and 0.331, respectively) ($p<0.05$). There was a positive moderate significant correlation between physical exercise subscale and physical functioning, general health, and energy subscales (rho values of 0.625, 0.529 and 0.426, respectively) ($p<0.05$).

Table 4: Distribution of SF-36 Quality of Life Questionnaire Scores According to Sociodemographic and Disease-Related Data

	SF-36 Quality of Life Questionnaire							
Characteristics	**Physical functioning**	**Physical role difficulty**	**Bodily Pain**	**General health**	**Energy**	**Social functioning**	**Emotional role difficulty**	**Mental health**
Gender								
Male	16 (10 - 30)	4 (4 - 8)	8 (1 - 10)	15 (6 - 24)	12 (6 - 24)	10 (2 - 10)	6 (3 - 6)	22 (10 - 28)
Female	12 (10 - 30)	4 (4 - 8)	5 (1 - 10)	12.4 (5 – 23.4)	10 (4 - 22)	10 (2 - 10)	3 (3 - 6)	19 (8 - 30)
	U= 1972.5	U= 2166.0	U= 2003.5	U= 2044.5	U= 2193.0	U= 2181.5	U= 2043.0	U= 2125.0
	p=0.008	**p=0.008**	**p=0.011**	**p=0.019**	p=0.074	**p=0.028**	**p=0.007**	**p=0.041**
Age								
≤ 49	22 (12 - 30)[a]	4 (4 - 8)	8 (1 - 10)	16.4 (10 - 22.4)	16 (6 - 19)	10 (2 - 10)	5 (3 - 6)	21 (12 - 30)
50-59	13 (10 - 30)[b]	4 (4 - 8)	5 (1 - 10)	16 (6 - 19.4)	12 (6 - 22)	10 (2 - 10)	6 (3 - 6)	19 (10 - 27)
≥60	12 (10 - 30)[b]	4 (4 - 8)	5 (1 - 10)	12 (5 - 24)	10 (4 - 24)	10 (2 - 10)	6 (3 - 6)	21 (8 - 28)
	X^2= 12.4	X^2= 2.0	X^2= 2.2	X^2= 6.7	X^2= 5.9	X^2= 1.2	X^2= 0.1	X^2= 0.2
	p=0.002	p=0.370	p=0.327	p=0.050	p=0.054	p=0.540	p=0.931	p=0.912
Education								
Illiterate	11 (10 - 30)[a]	4 (4 - 8)[a]	4 (1 - 10)	11.4 (6 - 22.4)	10 (6 - 22)	10 (2 - 10)	3 (3 - 6)	18 (10 - 30)[a]
Primary school	16 (10 - 30)[b]	4 (4 - 8)[a]	6 (1 - 10)	14 (5 - 23.4)	11 (6 - 24)	10 (2 - 10)	6 (3 - 6)	20 (8 - 28)[ab]
Secondary school	16 (10 - 30)[ab]	4 (4 - 8)[ab]	6 (2 - 10)	12.4 (6 - 22.4)	16 (4 - 22)	10 (2 - 10)	6 (3 - 6)	23 (14 - 26)[ab]
High school	12 (10 - 30)[ab]	4 (4 - 8)[ab]	9 (1 - 10)	13 (7 - 24)	8 (6 - 21)	7 (2 - 10)	6 (3 - 6)	21 (12 - 27)[ab]
University	23 (10 - 30)[b]	8 (4 - 8)[b]	10 (1 - 10)	16.4 (10 - 21)	14 (10 - 21)	10 (6 - 10)	6 (3 - 6)	25 (17 - 27)[b]
	X^2= 30.334	X^2=18.723	X^2= 12.787	X^2= 9.612	X^2= 12.987	X^2= 13.395	X^2= 11.116	X^2= 14.934
	p<0.001	**p=0.001**	p=0.050	p=0.050	p=0.050	p=0.050	p=0.050	**p=0.005**
Status of receiving diabetes training								
Yes	13 (10 - 30)	4 (4 - 8)	5 (1 - 10)	13.4 (5 - 24)	10 (4 - 24)	10 (2 - 10)	6 (3 - 6)	21 (8 - 30)
No	12 (10 - 30)	4 (4 - 8)	6 (1 - 10)	14 (6 – 22.4)	12 (6 - 22)	10 (2 - 10)	6 (3 - 6)	20 (10 - 28)
	U= 2319.5	U= 2439	U= 2589	U= 2646	U= 2715	U= 2535.5	U= 2634	U= 2529.5
	p=0.089	p=0.081	p=0.505	p=0.658	p=0.856	p=0.297	p=0.573	p=0.376
Using oral antidiabetic drug								
Yes	14 (10 - 30)	4 (4 - 8)	6 (1 - 10)	14 (6 - 23.4)	12 (6 - 22)	10 (2 - 10)	6 (3 - 6)	21 (10 - 28)
No	12 (10 - 30)	4 (4 - 8)	6 (1 - 10)	13 (5 - 24)	10 (4 - 24)	10 (2 - 10)	6 (3 - 6)	20 (8 - 30)
	U= 2450	U= 2688	U= 2588	U= 2648.5	U= 2268.5	U= 2657.5	U= 2497.5	U= 2338.5
	p=0.306	p=0.885	p=0.624	p=0.800	p=0.086	p=0.792	p=0.338	p=0.149
Using insulin injection								
Yes	12 (10 - 30)	4 (4 - 8)	5 (1 - 10)	13.4 (5 - 24)	10 (4 - 24)	10 (2 - 10)	6 (3 - 6)	20.5 (8 - 30)
No	14.5 (10 - 30)	4 (4 - 8)	6 (1 - 10)	13.5 (6 - 21.4)	14 (6 - 22)	10 (2 - 10)	6 (3 - 6)	21.5 (10 - 28)
	U= 1633.5	U= 1733	U= 1600	U= 1712	U= 1429.5	U= 1658	U= 1671	U= 1683.5
	p=0.429	p=0.654	p=0.341	p=0.678	p=0.080	p=0.419	p=0.484	p=0.583
Presence of diabetes complication								
Nephropathy	12 (10 - 30)[a]	4 (4 - 8)	4 (1 - 10)	13 (5 - 21)	10 (6 - 22)	10 (2 - 10)	6 (3 - 6)	20 (8 - 28)
Retinopathy	14.5 (10 - 30)[b]	4 (4 - 8)	5 (1 - 10)	14 (8 - 23)	12 (4 - 24)	10 (2 - 10)	3 (3 - 6)	19 (12 - 28)
Neuropathy	12 (10 - 30)[ab]	4 (4 - 8)	4 (1 - 10)	13 (5 - 24)	10 (4 - 22)	10 (2 - 10)	3 (3 - 6)	19 (8 - 30)
Diabetic foot	12 (10 - 23)[ab]	4 (4 - 4)	4 (1 - 10)	14 (10 - 18)	10 (6 - 21)	10 (2 - 10)	3 (3 - 6)	18 (10 - 26)
Coronary artery	12 (10 - 30)[ab]	4 (4 - 8)	5 (1 - 10)	12 (5 - 24)	10 (4 - 22)	10 (2 - 10)	6 (3 - 6)	20 (8 - 28)
disease	13 (10 - 16)[ab]	4 (4 - 4)	8 (8 - 8)	9 (7 - 11)	8.5 (8 - 9)	6 (2 - 10)	3 (3 - 6)	21 (19 - 23)
Cerebrovascular	22 (10 - 30)[b]	4 (4 - 8)	6 (1 - 10)	16.4 (8 - 23)	14 (6 - 24)	10 (2 - 10)	6 (3 - 6)	22 (10 - 30)
disease	X^2= 21.86	X^2= 5.37	X^2= 7.22	X^2= 5.69	X^2= 9.60	X^2= 2.75	X^2= 5.18	X^2= 5.40
No complication	**p= 0.003**	p= 0.614	p= 0.407	p= 0.576	p= 0.212	p=0.907	p= 0.638	p= 0.611

There is a statistically significant difference between different letters (a, b).

It was found that there was a positive weak significant correlation between blood sugar subscale and physical functioning, physical role difficulty, general health and mental health subscales (rho values of 0.215, 0.196 and 0.174, respectively) (p<0.05). A positive weak significant correlation was determined between general nutrition and medical treatment control subscale and physical functioning, general health, energy, social functioning and mental health subscales (rho values of 0.301, 0.190, 0.260, 0.173, and 0.248, respectively) (p<0.05).

DISCUSSION

In the study, diabetes self-efficacy levels of the patients were found to be low (Table 2). In a study stated that diabetes self-efficacy level of patients was low (16). In another study found that the patients had high self-efficacy level related to diabetes (17). In some studies stated that self-efficacy in diabetes was in moderate level (18,19). Differences in self-efficacy levels in diabetic patients in the literature is believed to be associated with the status of receiving diabetes training and the differentiation of content given in the diabetes trainings.

It was determined in the study that the quality of life of the patients was below the moderate level in physical functioning and physical role difficulty subscales (Table 2). In a study reported that physical limitation and general health were the mostly affected areas of quality of life of individuals with diabetes (20). In another study revealed that physical component of health-related quality of life of individuals with type-2 diabetes was lower compared to the normal population (p<0.05) (21). Similarly in another study reported that the individuals with diabetes had lower quality of life than those without diabetes (p<0.05) and all fields related to quality of life were affected in patients with diabetes (22). In their study, researchers found that the health-related quality of life of diabetic patients was low and discomfort dimension was observed mostly in the areas of pain/discomfort, anxiety/depression (23). Unlike these studies, some researchers stated that the quality of life perception of diabetic patients in their sample was positive (24). In a study found that the health-related quality of life was in moderate level in type-2 diabetic patients (25). Different levels of general and health-related quality of life of patients with type-2 diabetes in the literature were associated with the presence of multiple factors determining the quality of life.

In the present study, when the distribution of median scores of diabetes management self-efficacy was evaluated in terms of the descriptive characteristics of the patients, it was found that the variable of gender affected the physical exercise subscale and self-efficacy of women related to physical exercise subscale was lower (p<0.05, Table 3). There is a study supporting this result in the literature (26). In a study conducted on individuals with type-2 diabetes, it was reported 56% of men did exercise at least 5 days a week; whereas, this rate was 37% in women (p<0.05) (27). Social gender roles and the domestic roles of women were thought to be effective in this result.

Table 5: Correlation Analysis of diabetes Management Self-Efficacy Scale and SF-36 Quality of Life Questionnaire

Quality of Life \ Self-efficacy		Self-efficacy Total Score	Specific nutrition and weight	Physical exercise	Blood sugar	General nutrition and medical treatment control
Physical functioning	rho	0.405	0.182	0.625	0.215	0.301
	p	**<0.001**	**0.026**	**<0.001**	**0.008**	**<0.001**
Physical role difficulty	rho	0.208	0.201	0.360	0.063	0.081
	p	**0.010**	**0.013**	**<0.001**	0.442	0.326
Bodily pain	rho	0.127	0.060	0.374	0.102	0.029
	p	0.122	0.466	**<0.001**	0.213	0.729
General health	rho	0.333	0.160	0.529	0.196	0.190
	p	**<0.001**	0.050	**<0.001**	**0.016**	**0.020**
Energy	rho	0.349	0.217	0.426	0.099	0.260
	p	**<0.001**	**0.008**	**<0.001**	0.229	**0.001**
Social functioning	rho	0.233	0.262	0.208	0.064	0.173
	p	**0.004**	**0.001**	**0.011**	0.439	**0.034**
Emotional role difficulty	rho	0.213	0.148	0.282	0.152	0.118
	p	**0.009**	0.071	**<0.001**	0.063	0.150
Mental health	rho	0.379	0.331	0.387	0.175	0.248
	p	**<0.001**	**<0.001**	**<0.001**	**0.032**	**0.002**

rho: Spearman correlation analysis

Age was determined to be effective on self-efficacy in diabetes. It was found that diabetes management self-efficacy subscales were better in patients aged 49 years and younger and the difference between physical exercise, blood sugar, general nutrition and medical treatment control subscales and self-efficacy score was statistically significant ($p<0.05$). It has been reported in the studies that the variable of age affects the self-efficacy level and these concepts are parallel to each other (28,29). This has been associated with learning capacity changing with age.

It was found that the education status was effective on self-efficacy scores in physical exercise and blood sugar subscales ($p<0.05$). The studies have revealed that education status affects diabetes' self-efficacy fields that require individual follow-up and continuity such as medical treatment, blood sugar and physical activity (19,30). The result of the study is compatible with the literature. Self-efficacy scores of the individuals receiving diabetes training were found to be high. Status of receiving diabetes training significantly affects the self-efficacy field in blood sugar subscale ($p<0.05$). There are studies in the literature showing that diabetes training makes the patient adequate for his/her care and increases self-efficacy (30,31).

The use of OAD was found to be effective on general nutrition and medical treatment control and self-efficacy total score ($p<0.05$). Similarly, it was determined that the use of insulin increased the scores in all fields related to self-efficacy and significantly affected the self-efficacy related to blood sugar and general nutrition and medical treatment control fields ($p<0.05$). Different results have been reported in the literature (28,30). Diabetic treatments require the individual to pay attention to general nutrition rules and medical treatment. Therefore, patients must acquire self-efficacy in terms of possible effects of nutrition and medical treatment. In addition, the use of insulin also brings blood glucose monitoring. Characteristics related to the treatment types and the patient's efficacy related to the application of the treatment were thought to affect the result in this way.

Self-efficacy levels of individuals without diabetes complications were found to be higher. In a study reported that the presence of diabetes related complications affected self-efficacy (19). In the literature, there are studies reporting that the presence of complication does not affect self-efficacy (28,30,31). It is thought that this difference in the literature is caused by differences in patients' adaptation to the diabetes complications rather than their presence.

When the quality of life scores of the patients were examined, it was found that gender affected all subscales except for energy subscale and male gender had high scores ($p<0.05$, Table 4). Similar to the results of this study, it was reported in the studies that male patients had high quality of life related to physical functioning, social functioning, mental health, pain and general health (32-34). It was found in the literature that male patients had high mean scores in different scale subscales related to quality of life, which supports these results (35). Because of social gender roles, women spend more time at home and take more responsibilities in routine housework, and care of children, elderly and patients. On the other hand, men take less responsibility on these issues and participate more in social and sportive activities outside. It is believed that this difference in the gender roles of men and women contributes to the enhancement of quality of life of men in many areas.

It was determined that the variable of age affected the physical function-related quality of life and the individuals aged less than 49 years had higher quality of life ($p<0.05$). The quality of life of diabetic patients under 65 years of age was found to be high in the a study ($p<0.05$) (35). In another study found that there was a statistically significant difference between the age variable and general health and energy subscales ($p<0.05$) (32). Similarly, in a study, it is stated that the quality of life decreased with advancing age and the individuals aged 70 and over constituted the group having the lowest quality of life ($p<0.05$) (36). In another study revealed that the general quality of life of elderly patients with diabetes was significantly low (37). Finally, in a study reported that there was a decrease in the physical component of health-related quality of life in patients having type-2 diabetes with advancing age (21). The functional capacity deficiencies that develop in individuals having chronic illness along with increasing age were thought to affect the result in this regard.

It was found that the education status of the patients affected the quality of life related to physical functioning, physical role difficulty, and mental health ($p<0.05$). There are studies in the literature reporting that the education level positively affected the quality of life (33,38). Status of receiving diabetes training was found not to affect the quality of life subscales ($p>0.05$). In some studies studies found that the quality of life of patients who received diabetes training was high ($p<0.05$) (39,40). The study result is different from the literature. There is no standardization in the content of diabetes training. Along with the training containing only treatment and nutrition fields, comprehensive trainings containing complications and their management can also be given to the patients. Therefore, this difference was thought to be related to the content of training received.

It was determined that the use of OAD or insulin did not affect the quality of life ($p>0.05$). Similar to the results of this

study, there is a study reporting that the treatment type does not affect the quality of life (41). On the other hand, in a study determined that the use of insulin negatively affected physical health and reduced the general quality of life (38). In another study reported that the patients using only OAD obtained significantly high scores in energy, social functioning, and mental health subscales and general quality of life scores ($p<0.05$) (32). This result of the study was thought to be associated with treatment compliance rather than treatment type.

It was determined that patients without complications related to diabetes had high quality of life related to physical functioning ($p<0.05$). This result of the study is compatible with the literature (23,32,33,37,41). Diabetes complications negatively affect especially physical functioning and cause certain levels of physical limitations. Therefore, it was thought in the study that the physical functioning-related quality of life of patients reporting complications was lower compared to the patients without complications.

It was determined in the study that the quality of life increased as the self-efficacy in diabetes increased. There was a significant correlation between self-efficacy and all quality of life fields except for pain-related quality of life ($p<0.05$, Table 5). The results of the study are compatible with the literature (10,11,42). As the competence level regarding diabetes management increases, physical and psychosocial well-being increases and the possibility of complications decreases. Therefore, increasing self-efficacy in diabetes positively affects the quality of life in many ways.

In conclusion, it was determined in the study that self-efficacy levels of the patients and their quality of life related particularly to emotional role difficulty subscale were low. Self-efficacy in diabetes was affected by age, status of receiving diabetes training, and the use of oral antidiabetic drugs; whereas, quality of life was affected by gender, education status, and the presence of diabetes complications. It was determined that there was a positive correlation between diabetes management self-efficacy scale total score and all subscales of quality of life except for pain subscale.

Based on these results, it is recommended to organize effective diabetes training programs by determining diabetes related needs of patients in order to provide self-efficacy in diabetes and identify and follow-up the symptoms of emotional role difficulty in particular by the nurses. In addition, it is recommended to consider age, treatment method and diabetes-related information status of patients in interventions for gaining self-efficacy behaviors or diabetes management related skills.

For future studies, this study provides a basis for determining self-efficacy and quality of life levels of patients as a result of planned systematized training programs.

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The Authors Contributions

Concept/Design: **Burak Arslan, Afitap Özdelikara,** Data acquisition: **Burak Arslan, Afitap Özdelikara,** Data analysis and interpretation: **Burak Arslan, Afitap Özdelikara,** Drafting manuscript: **Burak Arslan, Afitap Özdelikara,** Critical revision of manuscript: **Burak Arslan, Afitap Özdelikara,** Final approval and accountability: **Burak Arslan,** Supervision: **Burak Arslan.**

Conflict of Interest

Burak Arslan and Afitap Özdelikara declare that no conflict of interest. Summary of the study was presented as a verbal presentation at the 2nd International Internal Diseases Nursing Congress held in 2020 (Online).

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Ethics Committee Approval

This study was approved by Ondokuz Mayis University Clinical Trials Ethics Committee (No:B.30.2.ODM.0.20.08\1031) (APPX.-V). The study was performed in accordance with the Helsinki Declaration of 1964.

Peer Review Process

Extremely peer-reviewed and accepted.

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