

Determination of disease acceptance and diabetes self-care activity levels in type 2 diabetes mellitus patients

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Cite this article as: Kargin, M., & Arpa, G. (2025). Determination of disease acceptance and diabetes self-care activity levels in type 2 diabetes mellitus patients. *J Nurs Care Res*, 2(1), 1-8.

Received: 26.10.2024

Accepted: 14.12.2024

Published: 25.03.2025

ABSTRACT

Aims: In this study, it was aimed to determine the acceptance of the disease and diabetes self-care activity levels of patients after the education given by nurses to 175 male and 129 female diabetes patients living in the northern part of Cyprus.

Methods: In the study, a three-stage questionnaire form consisting of the Demographic Information Form including the demographic characteristics of the patient receiving the training, the Disease Acceptance Scale and the Diabetes Self-Care Activities Questionnaire was used as a data collection tool.

Results: Disease acceptance scale scores did not differ statistically significantly according to gender, marital status, income status and with whom the patient lived ($p>0.05$). The disease acceptance scale was statistically significantly higher in patients with university education and above, employees and patients with social security ($p<0.05$). Diet dimension differed significantly according to gender and marital status ($p<0.05$); exercise dimension differed significantly according to education and employment status ($p<0.05$). There is a significant positive correlation between the disease acceptance score and the CBA diet ($\beta=.179$, $p<.01$) and CBA exercise ($\beta=.153$, $p<.01$). There is a significant negative correlation between the disease acceptance score and the number of years ago diagnosis ($\beta=-.214$, $p<.01$), cholesterol level ($\beta=-.187$, $p<.01$) and age variables ($\beta=-.170$, $p<.01$).

Conclusion: Acceptance of the disease was found to increase with education level. In case of disease acceptance, it was found that diet and exercise, which are the most important self-care activities of diabetes management, were managed appropriately and disease acceptance decreased with increasing age. In this case, the importance of education on disease management was revealed in order to maintain a positive disease acceptance status years after the diagnosis of the disease.

Keywords: Diabetes, disease acceptance, self-care activities, nursing

INTRODUCTION

Diabetes is a serious chronic disease that occurs when the pancreas cannot produce enough insulin, or the body cannot effectively use the insulin it produces. Diabetes is an important public health problem with an increasing number of cases and prevalence in the last decade (Soysal, 2019). The second category of diabetes, called type 2 diabetes (DM2), is the most common form that develops as a result of the combined effect of both insulin resistance and insufficient insulin secretion (Kalsi et al., 2015).

With an increasing global prevalence, DM2 is the leading cause of premature death, caused by the body not making enough insulin or not being able to use the insulin that the body produces (Ding et al., 2019). DM2 is characterized by microvascular pathology that, if mismanaged, leads to chronic complications and can lead to a range of health problems including heart disease, stroke, kidney disease, blindness,

nerve damage, leg and foot amputations and death (Lim et al., 2021). Preventable DM2 is the most common type of diabetes, usually starting when a person is in their mid-50s (Yazıcı, 2018).

The number of people with DM and 80% with DM2 living in low- and middle-income countries is increasing in every country. In 2011, 366 million people had DM and it is estimated that by 2030 the total number of people with DM will rise to 552 million, of whom 439 million will have type DM2. Another important problem is that DM caused 4.6 million deaths in 2011. By 2030, it is estimated that 4.6 million people will have DM. Although the incidence of DM2 varies greatly from one geographic region to another as a result of environmental and lifestyle risk factors, it can be said to be a growing public health problem (Oloboka et al., 2012).

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The World Health Organization (WHO) has stated that diabetes management reduces the risk of long-term complications (WHO, 2016). What needs to be done daily with diabetes management includes diet adjustment, exercise, foot care, medication adjustment and blood glucose monitoring. The aim of self-care of the patient with diabetes is to increase the quality of life and reduce complications (Coşansu, 2010; Dağdelen et al., 2023). In this sense, creating an awareness in the individual with diabetes with the education given to the patient and the person's acceptance of the disease contributes positively to the person's life while living with the disease (Ambrasio, 2015). Acceptance of the disease by the individual with chronic disease enables them to become more active in their own care, to realize self-care and to control the disease (Bertolin, 2015).

Home care in diabetic patients is an important issue in terms of improving the treatment process and the quality of life of the patient. In this process, various trainings are given to patients in health institutions, especially nurses, in order to enable patients to fulfill their own self-care and to increase their level of awareness about diabetes (Özcan, 1999; Şahin, 2015).

In order for these trainings given by nurses to be more effective and to provide more benefits to patients, their effectiveness should be evaluated and the factors affecting these effectiveness levels should be revealed. In this framework, the problem of the study is the effect of the trainings given by nurses to diabetes patients in TRNC on diabetes patients. The research is important both in terms of increasing the quality of life and diabetes attitude levels of diabetes patients and in terms of improving the content of the nursing trainings and making them more effective.

Purpose of the Study

This study was conducted to determine the levels of disease acceptance and diabetes self-care activities of diabetic patients.

METHODS

Ethics

Before starting the study, written permission was obtained from the Cyprus Science University Postgraduate Training and Researches Institute Ethics Committee (Date: 08.06.2021, Decision No: 2021/37) and TRNC Ministry of Health Dr. Burhan Nalbantoğlu State Hospital. All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki. After the purpose of the study was explained to the individuals included in the study by the researcher, written voluntary consent was obtained from those who agreed to participate in the study.

Research Type

The research will be designed in descriptive survey model and was conducted as a cross-sectional study.

Place and Time of the Research

The study was conducted in the Diabetes Outpatient Clinic of XXX State Hospital in the northern part of Cyprus between March 01 and May 31, 2021.

Population and Sample of the Study

The population of the study consisted of all patients diagnosed with diabetes who came to Dr. Burhan Nalbantoğlu State

Hospital Diabetes Outpatient Clinic in the northern part of Cyprus between March 01 and May 31, 2021, and the sample consisted of patients from this population who voluntarily wanted to participate in the survey and met the inclusion criteria. The inclusion criteria were defined as having diabetes for at least two years, having no comorbidities that would affect the results of the survey, and agreeing to participate in the study. In the study, all patients who came to the outpatient clinic between those dates were accepted as the population and the whole population was tried to be reached and 304 patients were reached in total (Czerw et al., 2022).

Data Collection Tools

As data collection tools in the study; Demographic Information Form, which includes the demographic characteristics of the patients and was prepared by the researcher by scanning the relevant literature, Acceptance of Illness Scale (AIS) and Summary of Diabetes Self-Care Activities Questionnaire (SDSCA) were used.

Demographic Information Form: The Demographic Information Form consisted of a total of 20 questions including age, gender, marital status, educational status, employment status, social security, income, with whom the patients lived at home, date of diabetes diagnosis, hospitalization at the first diagnosis, diabetes family history, type of treatment, home blood measurement status, most recent blood glucose values, diabetes education, support of relatives, complications and physical characteristics.

Acceptance of Illness Scale (AIS): The original form of the scale was developed by Felton and Revenson in 1984 based on Linkowski's Sickness Impact Scale. The scale, the Turkish validity and reliability of which was conducted by Büyükkaya Besen and Esen (2009), is used to determine the degree of disease acceptance of individuals diagnosed with hypertension, diabetes, rheumatoid arthritis and cancer. There are eight items in the five-point Likert-type Scale and the scale is scored between 1-5 with agreement and disagreement. The 6th item in the scale is reverse coded. The scale has no sub-dimensions and is evaluated based on the total score. A minimum of 8 and a maximum of 40 points can be obtained from the scale. Accepting the statements in the items in the scale is evaluated as 1 point. A low score on the scale means poor adaptation to the disease and a high score means acceptance of the disease. In the Turkish validity and reliability study, Cronbach's alpha value was found to be 0.79 and the Cronbach's alpha value of the scale was found to be 0.79 in the present study.

The summary of Diabetes Self-Care Activities Questionnaire (SDSCA): It was developed by Glasgow and Toobert in 1994 to evaluate the self-care activities of individuals diagnosed with diabetes. The Turkish validity and reliability of the scale was conducted by Coşansu (2009). This questionnaire consists of diet, exercise, blood glucose, foot care and smoking sub-dimensions of diabetes self-care activities. In order to evaluate diabetes self-care in these sub-dimensions, the individual is asked how many days (days/week) he/she has done these activities in the last week. In the answers given, there is a marking as days from 0 to 7. However, in the 11th item, which includes smoking, it is evaluated as 0-No, 1-Yes (amount of cigarettes smoked/piece/day) (Coşansu, 2010). All sub-dimensions of the scale can be scored separately and used independently: The cronbach alpha coefficients of the

questionnaire were found to be diet 0.59, exercise 0.70, blood glucose test 0.94 and foot care 0.77. In this study, diet was 0.42, exercise 0.81, blood glucose 0.93 and foot care 0.79.

Statistical Analysis

SPSS 24.0 package program was used to evaluate the data obtained in the study. Nominal and ordinal data were defined by frequency analysis, and measurement data were defined by mean and standard deviation. Kolmogorov Smirnov test was used for normality analysis of scale dimensions. Paired group differences of normally distributed parameters were analyzed by Independent Sample T test, and more than two-group comparisons were analyzed by one way ANOVA test. Spearman's rho correlation analysis was used for correlation analysis. All analyses were performed at 95% confidence interval.

RESULTS

The findings obtained from the research results are presented in this section.

When we look at [Table 1](#), it is seen that 175 (57.6%) of the participants in the study are male and 78.9% of the participants are married. 28.6% of the participants are primary school graduates, the majority of the participants (62.5%) are not working, but 80% of them have social security and 51% of them have an income equal to their expenses. Finally, it was determined that the majority of the participants (122 people, 40.1%) lived with their spouses and children.

Table 1. Sociodemographic variables

Variables	n (304)	%
Gender		
Male	175	57.6
Female	129	42.4
Marital status		
Married	240	78.9
Single	64	21.1
Educational status		
Literate	37	12.2
Primary school	87	28.6
Secondary school	52	17.1
High school	84	27.6
University and above	44	14.5
Working status		
Working	114	37.5
Not working	190	62.5
Social security		
Yes	245	80.6
No	59	19.4
Income status		
Income is less than expenses	131	43.1
Income is equal to expenses	155	51.0
Income is more than expenses	18	5.9
Whom do I live with?		
Alone	32	10.5
With my spouse	115	37.8
With my spouse and children	122	40.1
With my children	20	6.6
With my relatives	15	4.9

[Table 2](#) shows that 77.3% of the participants were not hospitalized at the first diagnosis, 76.0% had diabetes in the family, and 82.6% did not receive diabetes education. In addition, it was determined that 61.2% of the participants did not have diabetes complications, but 67.1% had non-diabetes diseases. It was found that 34.2% of the individuals participating in the study had a moderate level of support and the majority (76.0%) measured sugar at home. When the treatment modality of the participants was analyzed, it was found that 53.6% used OAD, 20.1% used insulin, 16.8% used OAD and insulin at the same time, and 9.5% used only diet therapy.

Table 2. Disease-related characteristics of diabetic individuals

Variables	n (304)	%
Initial diagnosis hospitalization status		
Yes	69	22.7
No	235	77.3
Diabetes in the family		
Yes	231	76.0
No	73	24.0
Diabetes education		
Yes	53	17.4
No	251	82.6
Diabetes complication		
Yes	118	38.8
No	186	61.2
Non-diabetic disease		
Yes	204	67.1
No	100	32.9
Diabetes-related support		
Nothing	60	19.7
Less	57	18.8
Middle	104	34.2
Very much	83	27.3
Home sugar measurement		
Yes	231	76
No	73	24
Treatment modality		
Oral antidiabetic	163	53.6
Insulin	61	20.1
Oral antidiabetic+insulin	51	16.8
Diet only	29	9.5

According to [Table 3](#), it was found that the participants were diagnosed an average of 13.57 ± 9.78 years ago, they performed 6.00 ± 10.18 glucose measurements per week, the mean of the most recent FPG was 139.14 ± 56.96 and the mean of the most recent TCS was 187.64 ± 71.44 . BMI was found to be 30.07 ± 6.32 and on the borderline of obesity. HbA1c had a mean total score of 7.84 ± 4.21 , cholesterol 192.59 ± 46.60 , triglycerides 151.12 ± 80.06 and HDL 43.90 ± 14.30 .

When we look at [Table 4](#), it was found that the mean total score of the CDQ was 31.73 ± 7.41 and the mean total score of the SLBA was 38.19 ± 14.30 . In addition, it was determined that the mean score of the diet sub-dimension was 17.37 ± 5.98 , the mean score of the exercise sub-dimension was 4.86 ± 5.24 , the mean score of the sugar measurement sub-dimension was 6.12 ± 5.65 and the mean score of the foot care sub-dimension was 9.75 ± 5.14 .

Table 3. Anthropometric characteristics and metabolic status of diabetics

Variables (n: 304)	Min	Max	Mean±SD
How many years ago	1	50	13.57±9.78
How many glucose readings per week	0	130	6.00±10.18
Last FBS	30	500	139.14±56.96
Latest PBS	2	500	187.64±71.44
BMI	19	56	30.07±6.32
HA1c	2	73	7.84±4.21
Cholesterol	76	494	192.59±46.60
Triglycerit	31	946	151.12±80.06
HDL	15	150	43.90±14.30

Min: Minimum, Max: Maximum, SD: Standard deviation, FBS: Fasting blood sugar, PBS: Postprandial blood sugar, BMI: Body-mass index, HA1c: Hemoglobin A1c, HDL: High density lipoprotein

When we look at **Table 5**, no difference was detected between gender and AIS ($p>0.05$), but a significant difference was

Table 4. Disease Acceptance Scale total score, mean scores of deba diet, foot care, exercise, glucose measurement

Variables (n: 304)	Min	Max	Mean±SD
Disease Acceptance Scale	8.00	40.00	31.73±7.41
DSCQ diet	.00	28.00	17.37±5.98
DSCQ exercise	.00	14.00	4.86±5.24
DSCQ sugar measurement	.00	14.00	6.12±5.65
DSCQ foot care	.00	14.00	9.75±5.14
Diabetes Self-Care Activities Scale total score	.00	70.00	38.19±14.30

Min: Minimum, Max: Maximum, SD: Standard deviation, DSCQ: Diabetes Self-Care Activities Questionnaire

found in the diet sub-dimension of the SDSCA ($p=0.017$), and it was found that women had higher scores than men. While there was no difference between marital status and AIS ($p>0.05$), a significant difference was found in the diet sub-dimension of the SDSCA ($p=0.027$), and it was observed that

Table 5. Comparison of the total score, mean scores of diets, foot care, exercise, glucose measurement and sociodemographic characteristics of individuals with diabetes

Variables	Disease Acceptance Scale mean±SD	DSCQ diet mean±SD	DSCQ exercise mean±SD	DSCQ sugar measurement mean±SD	DSCQ foot care mean±SD
Gender					
Male	31.79±7.14	16.41±5.91	5.18±5.22	6.80±5.72	9.42±5.19
Female	31.69±7.63	18.09±5.94	4.62±5.26	5.62±5.56	10.00±5.11
*t/p	-.120/.904	-2.410/.017	-.913/.362	-.792/.074	.973/.331
Marital status					
Married	31.73±7.39	16.97±6.02	4.63±5.09	6.19±5.74	9.55±5.33
Single	31.74±7.54	18.85±5.59	5.73±5.75	5.87±5.33	10.40±4.36
*t/p	-.008/.993	-2.228/.027	-.473/.173	.396/.692	1.459/.147
Education status					
Literate	26.74±8.24	18.69±6.52	3.51±4.94	6.27±5.80	9.59±5.04
Primary school	31.20±7.37	16.72±6.15	4.16±4.75	5.52±5.47	8.93±5.67
Middle school	31.82±6.22	16.76±5.62	4.06±4.85	5.20±5.20	10.30±4.70
High school	33.38±6.96	17.82±5.53	5.64±5.69	6.91±5.86	9.91±5.25
University and above	33.52±7.26	17.44±6.37	6.90±5.42	6.72±5.93	10.61±4.34
**f/p	6.150/.000	.946/.438	3.492/.008	1.099/.357	1.033/.390
Employment status					
Working	32.80±6.93	16.77±6.52	5.89±5.47	5.54±5.56	9.90±5.09
Not working	31.08±7.64	17.73±5.62	4.27±5.03	6.46±5.69	9.67±5.19
*t/p	1.964/.050	-1.337/.182	2.602/.010	1.351/.178	.374/.709
Social security					
Yes	32.42±6.77	17.57±5.89	5.11±5.32	6.07±5.67	9.77±5.11
No	28.70±9.23	16.54±6.30	3.82±4.83	6.33±5.59	9.70±5.34
*t/p	2.816/.006	1.171/.243	1.787/.077	-.311/.756	.091/.928
Income status					
Income less than expenditure	31.64±7.31	17.57±5.91	4.89±5.10	6.15±5.65	9.95±5.30
Income matches expenditure	32.03±7.16	17.43±5.96	4.86±5.46	6.27±5.70	9.76±4.99
Income more than expenditure	29.83±10.03	15.55±6.67	4.66±4.63	4.55±5.23	8.27±5.34
**f/p	.729/.483	.907/.405	.014/.986	.751/.473	.835/.435
Who she lives with					
Alone	31.37±7.38	17.90±5.85	3.56±5.08	5.68±5.34	10.53±4.29
With my wife	31.56±7.42	17.89±5.07	4.93±5.19	6.92±5.97	10.19±4.90
With my wife and children	32.09±7.39	16.48±6.56	4.88±5.22	5.66±5.47	9.20±5.56
With my children	29.85±7.90	18.00±7.21	4.25±5.09	4.75±5.39	9.50±5.13
With my relatives	33.40±7.268	18.60±5.96	8.00±5.88	6.33±5.35	9.53±5.27
**f/p	.616/.652	1.143/.336	1.836/.122	1.120/.347	.743/.563

*Independent samples T test, **One-way-ANOVA, DSCQ: Diabetes Self-Care Activities Questionnaire, SD: Standard deviation

the scores of single participants were higher. A statistically significant difference was found between education and the exercise sub-dimension of the SDSCA ($p=0.008$) and the AIS scores ($p=0.000$). According to employment status, there was a statistically significant difference between the exercise scores ($p=0.050$), one of the subgroups of the SDSCA, and the AIS scores ($p=0.050$). While there was no difference between the scale of SDSCA sub-dimensions and social security ($p>0.05$), it was observed that there was a statistically significant difference between the scores ($p=0.000$). There was no statistically significant difference between the scales according to income status and living with ($p>0.05$).

When we look at [Table 6](#), a significant difference was found between hospitalization status at the first diagnosis and AIS

($p=0.02$) and glucose measurement ($p=0.000$) among the subgroups of the SDSCA. A significant difference was also found between diabetes education and the SDSCA exercise ($p=0.006$) and SDSCA glucose measurement ($p=0.008$). A significant difference was found between diabetes complication and AIS ($p=0.000$), and exercise ($p=0.000$) and glucose measurement ($p=0.004$) from the sub-dimensions of the SDSCA. According to the non-diabetes disease status, a significant difference was found between the AIS ($p=0.000$) and exercise ($p=0.000$) among the sub-dimensions of the SDSCA. There was no significant difference between home glucose measurement and the patient acceptance scale ($p>0.05$), but there was a significant difference between diet ($p=0.002$), glucose measurement ($p=0.000$) and foot care ($p=0.038$), which are sub-dimensions of the SDSCA.

Table 6. Comparison of the total score of the Disease Acceptance Scale, mean scores of diets, foot care, exercise, glucose measurement and characteristics related to the disease in individuals with diabetes

Variables	Disease Acceptance Scale mean $\pm$ SD	DSCQ diet means $\pm$ SD	DSCQ exercise mean $\pm$ SD	DSCQ sugar measurement Mean $\pm$ SD	DSCQ foot care Mean $\pm$ SD
Initial diagnosis hospitalization status					
Yes	29.77 $\pm$ 8.44	17.80 $\pm$ 5.80	5.08 $\pm$ 5.00	8.42 $\pm$ 5.54	8.97 $\pm$ 5.64
No	32.30 $\pm$ 7.00	17.24 $\pm$ 6.03	4.80 $\pm$ 5.33	5.44 $\pm$ 5.51	9.99 $\pm$ 4.97
*t/p	-2.239/.028	.677/.499	.398/.691	3.912/.000	-1.448/.149
Diabetes in the family					
Yes	31.81 $\pm$ 7.33	17.24 $\pm$ 5.96	4.90 $\pm$ 5.25	5.83 $\pm$ 5.57	9.75 $\pm$ 5.05
No	31.50 $\pm$ 7.70	17.81 $\pm$ 6.06	4.74 $\pm$ 5.27	7.04 $\pm$ 5.84	9.75 $\pm$ 5.46
*t/p	.314/.754	-.699/.485	.220/.828	-1.585/.114	.014/.989
Diabetes education					
Yes	29.77 $\pm$ 8.97	18.67 $\pm$ 5.42	36.66 $\pm$ 5.63	8.00 $\pm$ 5.70	10.81 $\pm$ 4.59
No	32.16 $\pm$ 6.98	17.10 $\pm$ 6.06	4.47 $\pm$ 5.09	5.71 $\pm$ 5.57	9.53 $\pm$ 5.24
*t/p	-1.823/.073	1.726/.085	2.774/.006	2.691/.008	1.646/.101
Diabetes complication					
Yes	29.56 $\pm$ 7.77	16.87 $\pm$ 5.89	3.49 $\pm$ 4.66	7.30 $\pm$ 5.60	9.48 $\pm$ 5.09
No	33.12 $\pm$ 6.84	17.68 $\pm$ 6.02	5.74 $\pm$ 5.42	5.38 $\pm$ 5.57	9.92 $\pm$ 5.18
*t/p	-4.154/.000	-1.132/.259	3.695/.000	2.890/.004	-.733/.464
Non-diabetes disease					
Yes	30.34 $\pm$ 7.62	17.04 $\pm$ 6.16	3.99 $\pm$ 4.92	6.21 $\pm$ 5.52	9.76 $\pm$ 5.15
No	34.52 $\pm$ 6.12	18.04 $\pm$ 5.56	6.69 $\pm$ 5.45	5.93 $\pm$ 5.94	9.74 $\pm$ 5.15
*t/p	-5.117/.000	1.353/.177	-4.284/.000	.394/.694	.029/.977
Diabetes-related support					
Nothing	33.30 $\pm$ 7.69	16.65 $\pm$ 6.60	5.34 $\pm$ 5.55	3.84 $\pm$ 5.013	10.23 $\pm$ 4.78
Less	30.83 $\pm$ 7.35	16.87 $\pm$ 5.69	4.12 $\pm$ 4.30	5.46 $\pm$ 5.43	9.87 $\pm$ 5.34
Middle	31.32 $\pm$ 7.25	16.88 $\pm$ 5.81	4.90 $\pm$ 5.30	6.19 $\pm$ 5.74	9.49 $\pm$ 5.09
Very much	31.71 $\pm$ 7.40	18.81 $\pm$ 5.75	5.00 $\pm$ 5.58	8.09 $\pm$ 5.51	9.66 $\pm$ 5.39
**f/p	.729/.48	.907/.405	.014/.986	.751/.473	.835/.435
Home sugar measurement					
Yes	31.60 $\pm$ 7.29	18.07 $\pm$ 5.48	5.03 $\pm$ 5.34	7.60 $\pm$ 5.40	10.12 $\pm$ 4.97
No	32.18 $\pm$ 7.81	15.12 $\pm$ 6.93	4.34 $\pm$ 4.95	1.44 $\pm$ 3.45	8.60 $\pm$ 5.54
*t/p	-.577/.564	3.248/.002	.235/.337	11.364/.000	2.096/.038
Treatment modality					
Oral antidiabetic	32.92 $\pm$ 6.51	16.93 $\pm$ 6.02	5.07 $\pm$ 5.40	4.40 $\pm$ 5.09	9.70 $\pm$ 4.97
Insulin	29.78 $\pm$ 7.40	18.26 $\pm$ 5.43	4.16 $\pm$ 4.87	9.68 $\pm$ 5.06	8.94 $\pm$ 5.73
Oral antidiabetic+insulin	29.50 $\pm$ 8.83	18.04 $\pm$ 5.64	5.17 $\pm$ 5.30	9.07 $\pm$ 5.41	10.29 $\pm$ 5.00
Diet	33.20 $\pm$ 7.97	16.93 $\pm$ 7.19	4.59 $\pm$ 5.09	3.31 $\pm$ 4.46	10.72 $\pm$ 5.09
**f/p	4.841/.003	.965/.410	.521/.668	24.266/.000	1.015/.386

*Independent samples T test, **One-Way-ANOVA, DSCQ: Diabetes Self-Care Activities Questionnaire, SD: Standard deviation

A statistically significant difference was found between the type of treatment and AIS ($p=0.003$) and glucose measurement ($p=0.000$), which are among the sub-dimensions of SDSCA. It was determined that there was no statistically significant difference between the total scores of the scale and the support status related to diabetes and diabetes in the family ($p>0.05$).

When we look at **Table 7**, it was found that there was a significant positive correlation between the AIS and the variables of diet and exercise, while there was a significant negative correlation between the number of years ago diagnosis, cholesterol level and age. In this case, it was found that as the disease acceptance score of individuals with diabetes increased, they met their diet and exercise requirements more and cholesterol levels were lower in individuals who accepted their disease. It was determined that there was a negative significant correlation between diet and BMI and cholesterol among the sub-dimensions of the SDSCA and that individuals who followed their diet had lower BMI and cholesterol. It was determined that there was a significant negative relationship between exercise and the number of years ago diagnosis, BMI and cholesterol. A significant negative correlation was found between foot care, one of the sub-dimensions of SDSCA, and the number of years ago diagnosis.

DISCUSSION

In this section, the findings obtained from the study conducted to evaluate the disease acceptance status and diabetes self-care activities of patients diagnosed with diabetes are discussed in line with the relevant literature.

It is seen that the anthropometric characteristics and metabolic status of the research sample are compatible with the studies in the literature (Ke et al., 2022; Tomic et al., 2022; Awad et al., 2021; Ma et al., 2021; Chawla et al., 2020). In this respect, it is possible to state that the findings of the research findings regarding the education process of diabetic patients can be spread to a more general framework.

One of the most important stages of the treatment process of a disease is the patient's involvement in the process. Studies generally reveal that the level of disease acceptance differs

according to the demographic characteristics of individuals and characteristics related to the disease (Zwierzchowska, 2005). In our study, CDQ scores did not show statistically significant differences according to gender, marital status, income status and with whom the patient lived ($p>0.05$). On the other hand, a significant difference was found in favor of those with university education and above in the educational status of the patients, in favor of the employees and in favor of those with social security according to the working status ($p<0.05$). In other words, it is seen that individuals with university and higher education, those with social security and working individuals accept the disease more easily. The results obtained from the study reveal that individuals with higher levels of education and social status have a higher level of acceptance of the disease and that these individuals can also contribute more to the treatment process. Özdemir and Taşçı (2013) reported in their review on disease acceptance in different chronic diseases that demographic characteristics and education are effective on disease acceptance in different types of diseases. Similarly, there are studies in the literature reporting that the level of disease acceptance is also high in diabetic patients with high education level (Richardson, 2001; Büyükkaya Besen, 2009).

Diabetes self-care levels actually show the level and ability of diabetes patients to reflect the requirements of the disease to their daily lives, which is related to their level of internalization and acceptance of the disease in their daily lives. Therefore, it is important to measure diabetes self-care levels and to reveal the variables according to which they differ. In the literature, it has been revealed that especially the social and economic status of patients is effective on diabetes self-care practices (Bağrıaçık, 2011). In the present study, the diet score was higher in women and singles, while the exercise score was found to be higher in those with university education and above and in those who were employed. These results are consistent with the results of the literature and in general, it is seen that socio-demographic characteristics of individuals are effective on diet and exercise levels.

The level of disease acceptance is associated not only with the social and demographic characteristics of individuals, but also

Table 7. Correlation between individual and disease variables of the Disease Acceptance Scale and each self-care activity

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
AIS	1.00														
SDSCA diet	.179**	1.00													
SDSCA exercise	.153**	.209**	1.00												
SDSCA sugar measurement	.019	.295**	.150**	1.00											
SDSCA foot care	.101	.288**	.233**	.152**	1.00										
How many years ago	-.214**	.001	-.264**	.190**	-.139*	1.00									
How many glucose readings per week	-.093	.061	.019	.100	.004	-.005	1.00								
Last FBS	-.072	-.007	-.060	.121*	-.101	.154**	-.036	1.00							
Latest PBS	-.106	-.026	-.101	.135*	-.049	.113	-.100	.470**	1.00						
BMI	-.142	-.165**	-.187**	-.207**	-.082	.045	-.054	.029	.038	1.00					
HA1c	-.098	-.040	-.055	.128*	.022	.138*	.006	.269**	.183**	-.030	1.00				
Cholesterol	-.187**	-.163**	-.145*	-.052	-.018	.032	-.063	.228**	.316**	.142*	.113	1.00			
Triglyceride	-.092	-.063	-.056	.014	-.0311	.046	.182**	.150**	.178**	.150**	.136	.473**	1.00		
HDL	-.079	-.067	-.085	-.095	-.013	.037	-.166*	.081	-.008	.017	.106	.313**	.042	1.00	
Age	-.170**	-.054	-.176	-.032	-.026	.186**	.113	.031	-.006	.043	.029	.078	.029	.093	1.00

**The correlation is significant at the 0.01 level (2-tailed), SDSCA: Summary of diabetes self-care activities, FBS: Fasting blood sugar, PBS: Postprandial blood sugar, BMI: Body-mass index, HA1c: Hemoglobin A1c, HDL: High density lipoprotein

with the characteristics of the disease (Zwierzchowska, 2005). According to the findings of the study, the level of disease acceptance showed a significant difference according to the first hospitalization, non-diabetes disease, diabetes complication and treatment type ($p < 0.05$). The level of disease acceptance was higher in those who did not have a first hospitalization, in those who did not have diabetes complications and non-diabetes diseases, and in those who received diet therapy. Üstündağ and Dayapoğlu (2021) supported this in their study and reported that comorbidity negatively affected treatment and progression in patients with diabetes. Similarly, Aydoğan et al. (2020) reported that age and comorbidity were effective in diabetes treatment in patients with type II diabetes.

One of the most important factors affecting the degree of self-care in diabetic patients is the characteristics related to the disease (Özgül et al., 2016). Generally, in studies conducted in the literature, diabetes self-care is more compulsory in advanced patients, patients with higher education, and patients with more challenging treatment process. In these patients, disease-related characteristics statistically significantly and significantly affect diabetes self-care levels (Karakuş & Kasar, 2023; Bağrıaçık, 2011). In this study, the severity of the disease was higher in patients with higher levels of severity, those who received education, those who had a longer treatment period at home and those who stated that they felt the effects of the disease more. In fact, this is an expected result and it is possible to state that the individuals who suffer the most from any issue are the individuals who show the most sensitivity. In other words, it can be argued that the individuals who feel and experience the negative effects of diabetes and reduce their quality of life the most are actually the individuals who pay the most attention to diabetes self-care.

In fact, the results of the difference analysis show that individuals who received education and accepted the disease more generally took the necessary responsibilities related to the disease and had higher levels of self-care. However, in order to determine whether these results are statistically significant, correlation analysis was performed. The results obtained from the correlation analysis revealed that although there was a significant positive correlation between the SQS and the variables of SADD diet and SADD exercise, there was a significant negative correlation between the SQS and the variables of how many years ago the patient was diagnosed, cholesterol level and age. In other words, the level of disease acceptance was higher in those who practiced diet and exercise maintenance. In the literature, it was also found that there was no relationship between the level of disease acceptance and self-efficacy, which did not support our research finding (Şireci & Yılmaz Karabulutlu, 2017).

CONCLUSION

In the light of these findings, based on the finding that as the level of disease acceptance increases, patients give more importance to diet and exercise, which are the two most important dimensions of diabetes care, training to increase the level of disease acceptance in order to positively change the level of compliance with diets and exercise levels of patients. Based on the results that individuals with education, employment and social security have higher levels of acceptance of the disease and pay more attention to exercise and glucose measurements, the preparation of training programs that can also reach individuals with lower

education levels, who are not working and do not have social security. Adding to the content of the training to be given to patients that sugar measurement is affected according to the type of treatment, not only insulin users but also individuals with diabetes with other forms of treatment should pay attention to sugar measurement. Based on the finding that diabetic patients have a high level of acceptance of the disease in the absence of complications and attach importance to exercise, it may be recommended to improve the content of the trainings given to patients by nurses in order for patients to better understand the process and adopt them in their daily lives during the treatment process.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was carried out with the permission of the Cyprus Science University Postgraduate Training and Researches Institute Ethics Committee (Date: 08.06.2021, Decision No: 2021/37).

Informed Consent

All patients signed and free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

Acknowledgments

The authors would like to thank the participants in this study.

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