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The relationship between health literacy and self-efficacy in individuals with type 2 diabetes mellitus

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ABSTRACT

Aim: This study aims to analyze the relationship between health literacy and self-efficacy levels in individuals with type 2 diabetes.

Methods: The descriptive relational study was conducted with 469 individuals with diabetes who applied to the diabetes outpatient clinic of four state hospitals in Budur and Isparta provinces in Türkiye. The Socio-Demographic Information Form, Diabetes Health Literacy Scale (DHLS) and Type 2 Diabetes Self-Efficacy Scale (Type 2-DSES) were used as data collection tools. The data were analyzed using percentile, mean, Man Whitney U t-test, independent groups t-test, Kruskal Wallis test, one-way analysis of variance, Pearson correlation and multiple linear regression analysis.

Results: The mean DHLS scores of the individuals participating in the study were 40.31±9.34 (min=14, max=56), and the mean scores of Type 2-DSES were 70.63±12.32 (min=34, max=97). A significant correlation was found between the participants DHLS score and education, reading diabetes-related books, newspapers, etc., their Type 2-DSES total score, and exercise self efficacy sub-dimension scores (R^2=0.22, p<0.001).

Conclusion: It was revealed that the health literacy and self-efficacy levels of individuals with Type 2 Diabetes Mellitus were above the average, and the self-efficacy of individuals increased with the increase in health literacy level.

Keywords:
Health literacy, self-efficacy, type 2 diabetes mellitus,

1. INTRODUCTION

Diabetes has become an important public health problem threatening public health worldwide. According to the International Diabetes Federation (IDF) 2021 data, 10% of adults aged 20-79 years have diabetes. In the IDF 2021 data, it is estimated that the number of people with diabetes, which is 537 million, will increase to 643 million in 2030 and 784 million in 2045 (1). According to the Diabetes Epidemiology of Türkiye (2015-2020), a study conducted in Türkiye, it has been reported that the incidence of diabetes in adults aged 20 years and over has increased significantly compared to previous years and reached 13.7% (2). Individuals with diabetes are at risk for serious complications such as cardiovascular disease, kidney disease, neuropathy, retinopathy, and lower extremity amputation, which lead to increased mortality and morbidity (3,4).

The most important factor affecting mortality in individuals with diabetes is the lack of self-care behaviors, which are defined as the decisions and actions taken by the individual to cope with the health problem (5). Diabetes self-care behaviors include healthy eating, regular exercise, adherence to

diet, blood sugar control-monitoring and practice of skills to improve health (6). The concept of self-efficacy comes to the fore to develop self-care behaviors in individuals (5). Self-efficacy is expressed as one of the strongest sources of intrinsic motivation that empowers individuals to take responsibility for their health (7).

Health literacy is an important component in improving self-efficacy in individuals with diabetes (8-10). Health literacy is defined as the capacity of individuals to access, understand and implement health-related information (11). Studies have reported that individuals with low health literacy levels have lower disease self-management skills, and this situation increases health costs (12-15). In the Türkiye Health Literacy Survey conducted in our country, it was determined that 64.6% of the population had an inadequate or problematic level of health literacy (16). The European Health Literacy Survey found that 47% of the population had insufficient or problematic health literacy (15).

It is important to examine the relationship between health literacy and diabetes self-efficacy in individuals with diabetes. However, studies examining the relationship between health literacy and self-efficacy in individuals with type 2 diabetes in Türkiye are insufficient (17). This study aims to examine the relationship between health literacy and self-efficacy levels in individuals with type 2 diabetes.

Research Questions

1. What is the health literacy of individuals with type 2 diabetes?
2. What are the self-efficacy levels of individuals with type 2 diabetes?
3. Is there a significant relationship between health literacy and self-efficacy levels of individuals with type 2 diabetes?

2. MATERIALS AND METHODS

2.1. Sample and Setting

The descriptive relational study was conducted in the diabetes outpatient clinics of four hospitals in Burdur and Isparta provinces between January and July 2022. In the calculation of the number of samples to be reached from outpatient clinics, according to the International Diabetes Federation 2020 data, there are 6.592.400 Type 2 diabetes patients in Türkiye and its incidence is 12% (18). Based on these values, the minimum number of samples to be reached was calculated as 457, with a standard error of 3% and a reliability coefficient of 95%. Considering that incomplete or incorrect answers could be given, it was planned to reach more people than the sample number, and 469 individuals were reached.

2.2. Data collection

Research data were collected from all individuals who applied to diabetes outpatient clinics and met the inclusion criteria. After the necessary explanations were given to the individuals who agreed to participate in the study, the questionnaire forms were given and they were accompanied during the filling of the questionnaires. It took 10-15 minutes to fill out the questionnaires.

As data collection tools, Diabetes Health Literacy Scale (DHLS) and Type 2 Diabetes Self-Efficacy Scale (Type 2-DSES), and a 23-question questionnaire questioning some socio-demographic characteristics were used.

Diabetes Health Literacy Scale (DHLS): Diabetes Health Literacy Scale (DHLS), which was developed by Ishikawa et al (2008) to evaluate the functional, interactive and critical health literacy of adult patients with type 2 diabetes, was adapted into Turkish by Ağralı and Akyar (2017) (19). The scale consists of fourteen items and three sub-dimensions (functional, interactive, critical) and is a 4-point likert type. The functional health literacy consists of five items and refers to the understanding of health-related information. Interactive health literacy consists of five items and includes the cognitive and social skills necessary for people to communicate effectively. Critical health literacy, on the other hand, consists of four items and is explained by individuals' critical evaluation and use of health-related information so that they can have a say over their own health. The Cronbach's alpha value for the total score of the scale is 0.96, 0.96 for the functional health literacy

sub-dimension, 0.91 for interactive health literacy, and 0.96 for critical health literacy. As the score obtained from the scale and subscales increases, health literacy increases.

Type 2 Diabetes Self-Efficacy Scale (Type 2- DSES): The scale developed by Van Der Bijl et al. (1999) to determine the diabetes patients' perception of their power in performing their care and activities was adapted into Turkish by Kara et al. (2006) (20). The original scale consists of twenty items and four sub-dimensions and is a 5-point Likert type. In the intercultural adaptation study of structures by Kara et al. three dimensions of the scale were specified. These dimensions are; diet+foot control (Items 1-9, 11, 13, 14), medical treatment (Items 10, 12, 18-20) and physical exercise (Items 15-17). The Cronbach's alpha value for the whole scale is 0.89. The lowest score that can be obtained from the scale is 20, and the highest score is 100. The higher the score obtained in the evaluation of the scale, the higher the individual's self-efficacy.

2.3. Statistical Analysis

The data were analyzed using the SPSS 25.0 program using percentile, mean, Man Whitney U t-test, independent groups t-test, Kruskal Wallis test, one-way analysis of variance, Pearson correlation, and multiple linear regression analysis, and values of $p<0.05$ were considered significant.

2.4. Ethical considerations

The research was carried out with the approval of the (Ethics Approval Number: GO 2021/370, Date: 03.11.2021) from Burdur Mehmet Akif Ersoy University Non-invasive Clinical Research Ethics Committe the institutional permission from the Burdur and Isparta Provincial Health Directorates and verbal and written consent from the individuals who agreed to participate in the study.

3. RESULTS

The mean age of the individuals participating in the study was 57.67±10.58 years, and the duration of diabetes was 10.37±7.91 years. 66.7% of the participants are male, 91.3% are married, 72.2% have average monthly income, 79.3% are primary school graduates, and 16.8% are smokers. 48.6% of the participants had hypertension, 65.9% of them had other diabetes patients at home. When individuals were questioned about diabetes-related side effects, it was reported that they most commonly experienced loss of sensation in the feet and vision problems (Table 1).

Table 1: Distribution of participants by some socio-demographic characteristics (n=469)

Variables		Min-Max	Mean±SD
Age		22-94	57.67±10.58
Time of illness (years)		1-45	10.37±7.91
BMI (kg/m²)		16.65-62.53	31.36±6.11
		n	%
Gender	Male	156	66.7
	Woman	313	33.3
Marital status	Married	428	91.3
	Single	41	8.7
Perceived monthly income	Low	68	14.2
	Medium	337	72.2
	High	64	13.6
Education	Primary school	372	79.3
	High school	58	12.4
	University	39	8.3
Smoking	Yes	79	16.8
	No	390	83.2
*Other chronic diseases	Hypertension	228	48.6
	Heart diseases	95	20.3
	Asthma	63	13.4
Existence of another diabetic individual at home	Yes	309	65.9
	No	160	34.1
Regular doctor check	Yes	370	78.9
	No	99	21.1
*Side effects related to diabetes	Vision problems	85	18.1
	Loss of sensation in the feet	102	21.7
	Bruises on the feet	37	7.9
	Kidney diseases	40	8.5
Diabetes education	Yes	252	53.7
	No	217	46.3

*More than one choice is marked. SD:standard deviation. BMI: Body Mass Index

Table 2: Distribution and significance of some socio-demographic characteristics of the participants, and diabetes health literacy and mean scores of the self-knowledge scale in type 2 diabetes

Characteristics (n=469)			DHLS		Type 2-DSES	
			Average± SS	p	Average± SS	p
Gender	Male	313	40.38±9.40	[1]0.58	70.96±12.98	[2]0.67
	Female	156	40.16±9.24		70.46±12.00	
Marital status	Married	428	40.17±9.27	[1]0.23	70.53±12.18	[2].057
	Single	41	47.78±10.06		71.65±13.86	
Education	Primary	372	38.80±9.07	**[3]0.00**	69.62±12.20	**[4]0.00**
	High school	39	45.24±7.69		76.00±10.58	
	University	58	47.35±8.44		72.25±13.89	
Diabetes in first degree relative	Yes	390	40.61±9.22	[1]0.25	70.85±12.10	[2]0.58
	No	160	39.72±9.56		70.20±12.77	
Other chronic diseases	Yes	308	39.04±9.70	**[1]0.00**	70.04±12.36	[2]0.15
	No	161	42.04±8.36		71.75±12.20	
Regular check	Yes	377	40.85±9.69	**[1]0.00**	71.58±12.14	**[2]0.00**
	No	92	38.08±7.37		66.72±12.38	
Reading books. newspapers. magazines etc. about diabetes	Yes	218	43.64±8.32	**[2]0.00**	73.56±11.52	**[2]0.00**
	No	251	37.41±9.22		63.07±12.46	

[1]Man Whitney U t test, [2] t test in independent groups, [3]Kruskall wallis test, [4]One-way analysis of variance (ANOVA) DHLS: Diabetes Health Literacy Scale DHLS; Type 2-DSES: Self-Efficacy Scale in Type 2 Diabetes

The participants' mean Type 2- DSES scores were 40.31±9.34 (min=14, max=56), and Type 2-DSES mean scores were 70.63±12.32 (min=34, max=97).

There is a statistically significant difference between the education level of the participants and the DHLS score averages (p<0.01). Accordingly, university graduates have higher scores than others. DHLS score averages of those who do not have any other chronic disease are statistically higher (p<0.01). DHLS score averages of those who regularly go to their controls are statistically higher than those who do not (p<0.01). The DHLS score averages of those who read books, newspapers, etc. about diabetes were statistically higher than those who did not (p<0.01). There was no statistically significant difference between the participants' gender, marital status, presence of diabetes in first-degree relatives, and the mean DHLS score (p>0.05) (Table 2).

There was a statistically significant difference between the education level of the participants and their Type 2-DSES mean scores (p<0.01). Accordingly, the scores of those who graduated from high school are higher than the others. The mean Type 2-DSES score of those who regularly go to their check-ups is statistically higher than those who do not (p<0.01). Those who read books, newspapers, etc. about diabetes had a statistically higher mean score of Type 2-DSES than those who did not (p<0.01). There was no statistically significant difference between the participants' gender, marital status, presence of diabetes in first-degree relatives, presence of another chronic disease, and Type 2-DSES score averages (p>0.05) (Table 2).

There was a significant, weak, and positive correlation between the DHLS total score averages of the participants and the Type 2-DSES total score, Diet and Foot Control, Medical treatment, and Exercise summary sub-dimensions (respectively r=0.39, r=0.35, r=0.18, r=0.24) (p<0.001) relationship was found (Table 3).

Functional health literacy sub-dimension score and Type 2-DSES total score, Medical treatment self-efficacy subscales were significant, weak and positive (r= 0.10; 0.11, respectively), and Exercise Self-Efficacy sub-scale was significant. moderate and positive (r=0.35), p<0.001 correlation was found in all correlations (Table 3).

Significant, moderate, and positive correlations (r=0.36, 0.35, 0.31 were found respectively) between the participants' interactive health literacy sub-

Table 3: The distribution of correlation between the health literacy scale in diabetes and the self-efficacy scale in type 2 diabetes

	Self-Efficacy Scale Type 2 in Diabetes			
	Scale total	**Diet and Foot Control Subscale**	**Medical treatment subscale**	**Exercise subscale**
	r/p	r/p	r/p	r/p
Health literacy scale	**0.39/**	**0.35/**	**0.18/**	**0.24/**
Total score	**<0.001**	**<0.001**	**<0.001**	**<0.001**
	0.10/	0.04	**0.11**	**0.35/**
Functional health literacy subscale	**0.001**	0.32	**0.001**	**<0.001**
Interactive health literacy	**0.36**	**0.36**	**0.25**	0.06/
subscale	**/<0.001**	**<0.001**	**<0.001**	0.15
	0.36	**0.35**	**0.31**	0.03/
Critical health literacy subscale	**/<0.001**	**/<0.001**	**/<0.001**	0.40

*Pearson Correlation Coefficient p<0.05

dimension score and Type 2-DSES total score, Diet and Foot Control, and Medical Treatment subscales, and p<0.001 relationship was found in all of them.

Significant, moderate, and positive (r=0.36; 0.35; 0.31) correlations were found between the participants' critical health literacy subscale and Type 2-DSES total score, Diet and Foot Control, and Medical Treatment subscales and p<0.001) correlation was found in all of them (Table 3).

After examining some characteristics of the participants, the distribution of the mean scores of a Type 2-DSES and their significance (p) levels, the statistically significant variables were included in the regression analysis. In the regression analysis, the presence of multicollinearity was examined, and the diet and foot control variables were excluded from the analysis, since there was a high correlation between the Type 2- DSES, and the diet and foot control subscales.

There is a statistically significant relationship between the education of the participants and their DHLS total score, and when other variables are controlled, the mean DHLS total score of university graduates is 0.13 units higher than the others (Table 4).

Books etc. about diabetes of the participants. There is a statistically significant relationship between the participants' habits of reading books etc. about diabetes and their DHLS total scores, and when other variables are controlled. Type 2- DSES total score averages of those who read are 0.22 times higher than those who do not (Table 4).

There is a statistically significant relationship between the participants' DHLS scores and Type 2- DSES total scores, and when other variables are controlled, when diet and foot control subscale scores increase by one unit, the Type 2- DSES total score increases by 0.21 units (Table 4).

Table 4: Multiple regression analysis results on the interpretation of the health literacy scale score in diabetes

	Diabetes Health Literacy Scale			
Variable	**B [SH]**	**p**	**Beta**	**%95 CI*** **Lowest/ Highest**
Fixed	21.93 (2.93)	0.00		16.16/27.70
Education[1]	3.71 (1.19)	**0.00**	0.13	1.37/6.06
Regular check-ups[2]	0.91 (1.02)	0.37	0.03	1.10-2.93
Reading books etc. about diabetes [3]	4.15 (0.83)	**0.00**	0.22	2.52-5.79
Type 2 Diabets Self-Efficacy Scale	0.20 (0.04)	**0.00**	0.21	0.11-0.29
Medical treatment self-efficacy scale	0.14 (0.13)	0.29	0.05	0.12-0.40
Exercise Self-Efficacy Scale	0.42 (0.11)	**0.00**	0.16	0.19-0.65

R=0.47. R^2=0.22. F=20.83. p<0.001

CI: Confidence Interval. 1 Reference group "university", 2 Reference group: those who go to regular check-ups, 3 reference groups: Reading books, newspapers, magazines, etc. about diabetes.

There is a statistically significant relationship between the participants' exercise self-efficacy subscale scores and their Type 2- DSES total scores, and when other variables are controlled and the exercise subscale score increases by one unit, the Type 2-DSES total score increases by 0.16 units. It was determined that the habit of going to regular check-ups and the Medical Treatment self-efficacy subscale score did not significantly predict the DHLS score.

4. CONCLUSION

For the management of Type 2 diabetes, which is a chronic disease, individuals should have knowledge about the disease, be able to reflect on the knowledge they have acquired in their care practices, and know how to access the health services provided (17). This study aims to analyze the relationship between health literacy and self-efficacy in individuals with Type 2 Diabetes Mellitus.

At the end of the study, it was found that the individuals' health literacy scores in diabetes were above the average. There are different results in the literature on the subject. In some studies, the health literacy level of individuals with diabetes is insufficient and moderate (21-27) while in some studies it has been reported that individuals have an above-average and sufficient health literacy level (9, 28, 29). It is thought that the reason for the different results is due to the cultural differences and in the differences measurement tools used in the research.

With the increase in the education level of the individuals, they can understand what they read and manage the disease in the right way, the patient's communication with health professional's increases and they can reach the right information. They enable the patient to take a more active role in the planning and decision-making process about the disease. In this study, it was determined that the education level of the individuals affected the diabetes health literacy level. University graduates have higher health literacy. Similarly, studies have found that as the level of education increases, the level of health literacy also increases (17, 28, 30, 31).

In this study, it was determined that individuals who do not have any chronic diseases other than diabetes had higher health literacy levels. Güner et al. (2020) determined in their study that individuals with diabetes who had another chronic disease had a lower health literacy level (22). In the study by Eker (2021), it was determined that the health literacy levels of those who did not have any chronic disease other than diabetes were higher (32). The results of the study were similar to the results in the literature. It is thought that having an additional chronic disease affects the individual's life motivation by causing an increase in the number of drugs used daily and the application of more than one diet program.

In this study, the health literacy levels of those who read books, newspapers, etc. about type 2 diabetes were found to be high. In their study, Özcan and Özkahraman (2021) determined the health literacy levels of patients who received information about Type 2 diabetes from various sources such as magazines, newspapers, brochures, and the internet high (33). Uğurlu and Akgün (2019) reported in their study that individuals with low literacy skills had low health literacy levels (34). In another study on the subject, it was stated that individuals with a high level of health literacy had responsibilities in the protection and maintenance of health and could easily understand the information they have acquired (35). These results suggest that Type 2 diabetes patients are individuals who obtain and apply information about their health and disease from various sources.

In this study, the self-efficacy levels of individuals with diabetes were above the average. Similarly, Kiziltepe et al. (2019) found that the individuals' self-efficacy levels in diabetes were above the average in their study (36). In studies of self-efficacy, depression, and self-care activities of individuals with type 2 diabetes in Türkiye, Kav et al. (2017) found that individuals' self-efficacy levels were above the average (37). Since diabetes is a chronic disease, the long duration of treatment and care can be considered as the reason why individuals' self-efficacy is above the average.

In this study, diabetes self-efficacy scores were found

to be higher in those who regularly went to their check-ups. When the studies were examined, it was determined that the self-efficacy levels of those who regularly went to check-ups were found to be high (38, 39). This situation reveals that individuals who go to regular check-ups care about their diseases, have a high belief in dealing with problems better, and put more effort in this regard.

Regression analysis of the study indicated that the health literacy of individuals with type 2 diabetes was significantly associated with diabetes self-efficacy. This result indicates that the increased level of health literacy in individuals with diabetes also increases the self-efficacy of individuals. Similarly, studies on the subject have revealed a relationship between health literacy and self-efficacy (40, 41).

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